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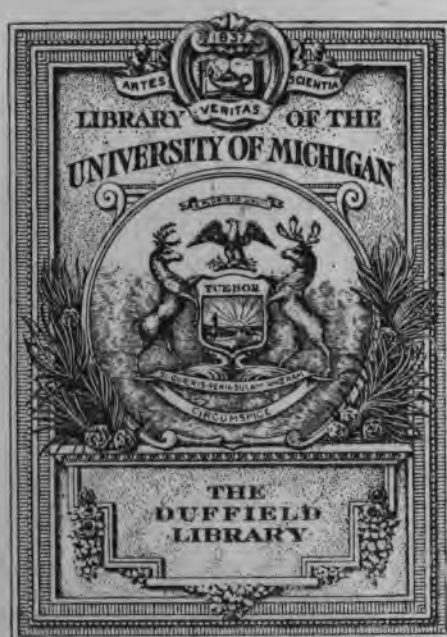
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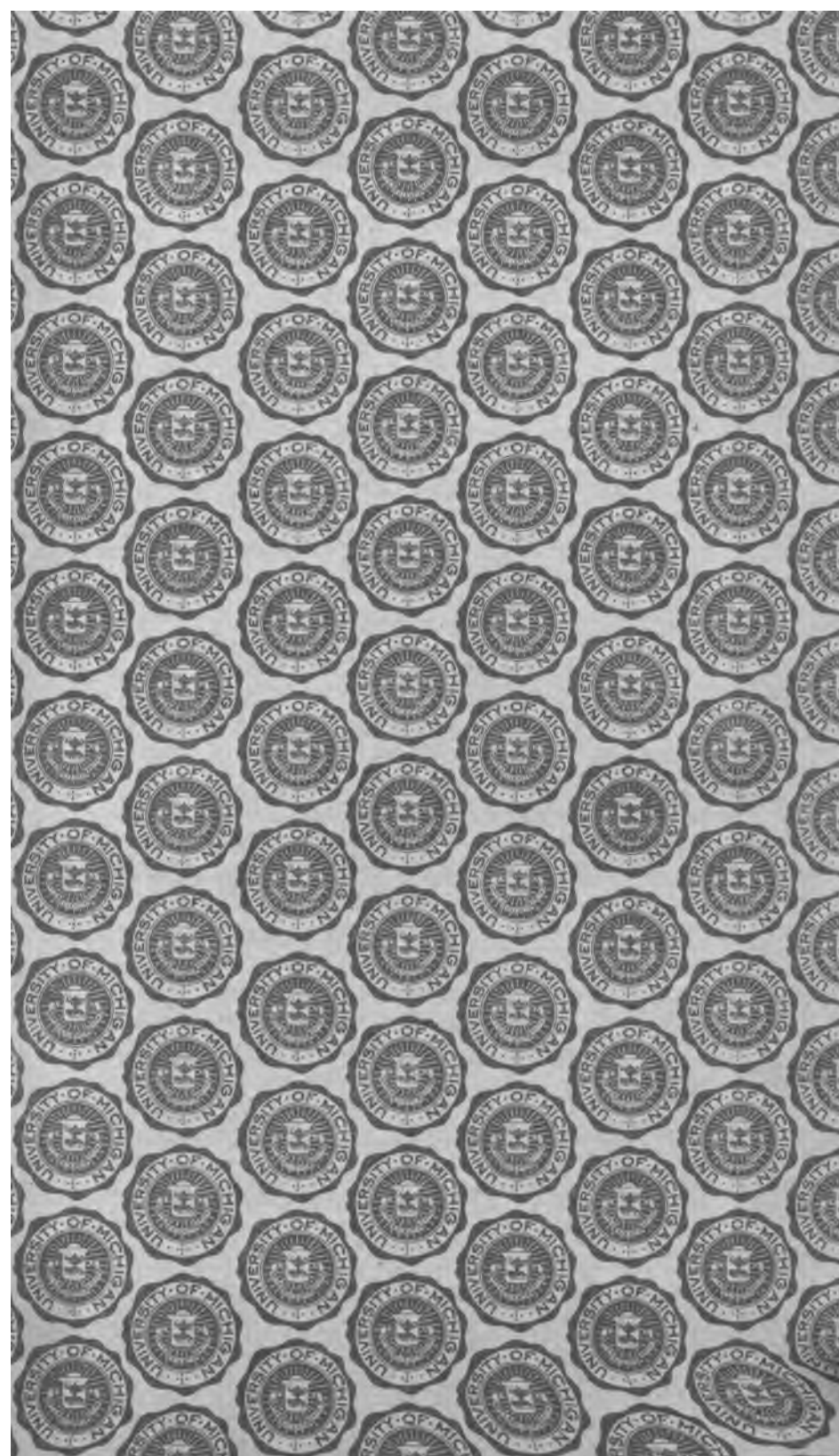
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Physical Training Conference

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PHYSICAL TRAINING

A FULL REPORT OF THE
PAPERS AND DISCUSSIONS
OF THE
CONFERENCE HELD IN BOSTON IN
NOVEMBER, 1889.

REPORTED AND EDITED BY ISABEL C. ^{chapin}BARROWS.

BOSTON :
PRESS OF GEORGE H. ELLIS, 141 FRANKLIN ST.
1890.

INTRODUCTORY NOTE.

THE Conference in the interest of Physical Training which took place in Boston November last, a full report of which is herewith presented, was held in pursuance of the following call:—

“A Conference in the interest of Physical Training will be held in Huntington Hall, Massachusetts Institute of Technology, Boston, on Friday and Saturday, Nov. 29 and 30, 1889. . . .

“The object of this Conference is to place before educators different systems of gymnastics, and to secure discussion of the same with a view to clearly ascertaining the needs of schools, and determining how they may best be met.

“The Conference will be presided over by William T. Harris, LL.D., United States Commissioner of Education. . . .

“Many prominent educators have signified their intention of being present, and a cordial invitation is extended to all who are interested in this important subject.”

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FRANCIS A. WALKER, *President Mass. Institute of Technology.*

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CONTENTS.

INTRODUCTORY NOTE, ...	1
FIRST SESSION :	
Physical Training, an address by William T. Harris, LL.D., ...	1
The Nature of Physical Training and the Best Means of securing its Ends, by Edward Mussey Hartwell, Ph.D., M.D., ...	5
The German System of Gymnastics, by H. Metzner, ...	23
Discussion :	
Dr. W. T. Harris, ...	28
Edwin P. Seaver, ...	28
Dr. E. M. Hartwell, ...	29
Dr. E. Hitchcock, ...	32
Edwin P. Seaver, ...	32
Dr. E. M. Hartwell, ...	33
Larkin Dunton, ...	33
Dr. John P. Reynolds, ...	33
The Place of Physical Training in a Rational Education, by Claes J. Enebuske, Ph.D., ...	35
SECOND SESSION :	
The Chief Characteristics of the Swedish System of Gymnastics, by Nils Posse, M.G., ...	42
Discussion :	
The Earl of Meath, ...	51
Dr. J. W. Seaver, ...	52
Dr. W. G. Anderson, ...	54
Some Principles regarded as Essential in the Direction of the Department of Physical Education and Hygiene, by Edward Hitchcock, M.D., ...	57
Discussion :	
Dr. Alice T. Hall, ...	59
Dr. Helen Putnam, ...	59
Dr. E. M. Hartwell, ...	61
THIRD SESSION :	
The System of Physical Training at the Hemenway Gymnasium, by D. A. Sargent, M.D., ...	62
Discussion :	
Dr. Walter Channing, ...	77
Miss Lucile Eaton Hill, ...	79
Dr. Carolyn C. Ladd, ...	80
Miss Rutch C. Tousley, ...	80

Ray Greene Huling, ...	81
Dr. L. V. Ingraham, ...	82
Dr. F. N. Whittier, ...	83
General Francis A. Walker, ...	85
\The Laws to be followed in teaching Physical Culture, by Dr. C. W. Emerson, ...	87
FOURTH SESSION: .	
Remarks by E. P. Seaver, ...	96
The Pedagogic Phase of Physical Training, by Hamilton D. Wey, M.D.,	99
Address of M. de Coubertin, ...	112
Address of S. S. Curry, ...	115
Military Drill, by Hobart Moore, ...	121
Appointment of Permanent Committee, ...	126
Remarks of Dr. D. A. Sargent, ...	126
Remarks of Nils Posse, ...	128
Remarks of Dr. E. M. Hartwell, ...	129
Resolution of Thanks, ...	132
NAMES OF WRITERS AND SPEAKERS, ...	133
INDEX OF SUBJECTS AND BOOKS TO WHICH REFERENCE WAS MADE, . .	134

First Session.

PHYSICAL TRAINING.

A CONFERENCE in the Interest of Physical Training was held at Huntington Hall, Massachusetts Institute of Technology, Boston, on Friday and Saturday, Nov. 29 and 30, 1889. William T. Harris, United States Commissioner of Education, presided. In opening the Conference, Dr. Harris said:

We open this morning a Conference devoted to the consideration of physical exercises for the development of the body. Physical training, I take it, is a part of the subject of hygiene in its largest compass, which includes dietary and digestive functions, and matters of rest and repose as well as matters of muscular training. We wish to discuss physical training in view of hygiene, and to avoid, if we can, all narrow interpretation of our subject. The advantage of such a Conference as this is that extremes come together; and, by comparison of views, each one learns to supplement his own deficiencies. We shall all be delighted to find new phases of the subject. Hygiene wishes to make the most of the body for human purposes,—not for animal purposes, but for *human* purposes. Hygiene includes several departments, of which physical training is one.

I shall define physical training as the conscious or voluntary training of the muscular side of our system, which is the special side under the control of the will. Of course we understand that the vital processes go on without the will, and that this is an advantage,—it is better that they should remain involuntary. Of course the voluntary system has relations to the involuntary system, and this is one of the first questions which have been considered by persons who have thoroughly studied physical training. What can we do with our wills? What can we do with our muscles that shall help on the vital

processes and develop them? That is a deep subject. It should be the first which attracts the attention of persons interested in physical education, and it should be also the last one. We ask what we can do by the action of our wills in the matter of developing the muscles of the chest, of the legs, and of the arms, and inquire what are the relations of muscle-action to digestion and sleep and such matters. We have not yet probed these subjects to the bottom, nor have we ascertained the fundamental relations of the voluntary to the involuntary functions in diseased conditions. We are continuously finding some new phases, and I suppose the medical profession discover more new facts in relation to this than persons specially interested in physical training alone. Physicians discover cases in which some oversight in regard to will-training has resulted in interfering more or less with the involuntary processes, so that the latter have been retarded, thus injuring some of their functions. We all acknowledge the importance of discovering and settling the limits between these two processes and defining all the relations between the involuntary vital processes and the conscious voluntary movements, and the transition of these voluntary movements into involuntary ones again through the principle of habit. The exercise of the muscles by voluntary effort calls into action the higher nervous motor-centres of the body and brain. That is to say, physical training such as is advocated by us relates especially to the will, and therefore to the very highest nerve-centres of the physical system. This reveals its relation to rest and recreation. Now, when one, for instance, is studying science or art or literature or any school studies, he is exercising these same high nerve-centres. Let him pass from study to one of these systematic physical exercises, and he does not get the required rest. It is not rest and repose from the exercise of these higher nerve-centres, at least. Of course all of our specialists in physical training know that it is not a relief from will-tension, and the question remains: In how far is such exercise as that valuable? In what way is it a relief? Those who put forward theories of physical exercise and training have their views with regard to this, and the opinions of different

individuals vary. I take it that one of the most important results of this Conference will be the adjusting of differences of opinion with regard to this point,—in how far the use of the muscles by the will can afford rest and recreation from studies and from sedentary occupations, and in how far they will serve so well as free play. We all know the difference between play and work. In our play, caprice governs, and there is real repose for the will. But in work the will takes the body and the mind and puts them under forms prescribed by others or under such forms as it has adopted for itself in its rational hours. Its action in work is as much inhibitory and holding back as it is spontaneous and free exercise. But play is not inhibitory. Play has its use in education. We are discovering more and more how play is an exceedingly important function; that it is the source of the development of individuality through spontaneity. The individual through play learns to know, to command, to respect himself, and to distinguish between his own impulses and inclinations and those of others. Great strength of individuality grows from play. Nations that postpone play until maturity fail in this respect. In China it is said that old men of sixty enjoy flying kites. In this country boys of twelve or fifteen fly kites; but there aged men love to do it; and children do not feel the same interest in play in China as they do here.

These considerations, with regard to the relation of the voluntary culture of the body to the involuntary, the relation of the muscles to the vital organs, have been receiving much attention in *the new physical education*: the old physical education thought that muscular education was all that was necessary to the training of the body, and this view prevailed here up to about the year 1860. The new physical education began with the work of Dr. Hitchcock at Amherst, and was followed up by Dr. Sargent in the Hemenway Gymnasium at Cambridge, Dr. Hartwell at the Johns Hopkins, and their co-workers in the various colleges and universities. The student now studies this problem broadly, and focuses his attention on this relation of the voluntary to the involuntary, and tries to discover whereby the vital organs,—the lungs, the heart, the

stomach, all the digestive organs, the kidneys,—in short, how all the functions that are involuntary in their action may be assisted and influenced by voluntary action and motion. The old gymnastic did not pay attention enough to this relation of exercise to the vital organs to discover its negative effects. It did not determine the limits of muscular training. In the case of calisthenics, for example, the will-power is called into play, and it is no relief from the strain on the brain to go from the study of arithmetic or from the concentration of attention on the work in recitation to the performance of physical manœuvres that demand close attention to the teacher who gives the signal for the calisthenic exercises. A very powerful exercise of the will is demanded in calisthenics, whereas free play (not systematic games) is rest for the will. The recess spent in play in the school-yard is a great rest and refreshment. I mention this because there has been a movement throughout the country, commencing long ago in Evansville, Ind., to do away with the recess. A superintendent who had given much time to studying the moral development of children came to believe that the recess is the cause or the means of a great deal of immorality, and that by abolishing it he would bring the pupil more under the control of the teacher, thereby increasing the moral hold on the pupil. That movement spread to various places in this country. Rochester for a long time has had no recess. At Albany, also, the schools have no recess. This abolishing of the recess has led our conservative educators who hold their faith in the old regulation to look with suspicion on this experiment, and to try to discover in what forms there is apparent a physical reaction, and in what forms there are counter-movements on the part of physicians and others, tending to mould public opinion.

I hope that the papers and discussions will discuss elaborately and settle these questions which naturally arise in our minds. I have the pleasure of introducing as the first speaker Dr. Edward M. Hartwell of Johns Hopkins University, who will speak on the Nature of Physical Training and the Best Means of securing its Ends.

THE NATURE OF PHYSICAL TRAINING, AND THE BEST MEANS OF SECURING ITS ENDS.

BY EDWARD MUSSEY HARTWELL, PH.D., M.D.,

ASSOCIATE IN PHYSICAL TRAINING AND DIRECTOR OF THE GYMNASIUM, IN THE
JOHNS HOPKINS UNIVERSITY, BALTIMORE.

IN ordinary speech it is convenient to speak of moral, mental, and physical training as if they had little or nothing in common; though, strictly speaking, the principles which underlie each are practically the same. My main contention in regard to the nature of physical training is, that bodily exercise constitutes so considerable and necessary an element in all human training that physical training is entitled to be recognized and provided for as an integral and indispensable factor in the education of all children and youth.

The aim of any and of all human training is to educe faculty, to develop power. As the means of developing power, certain actions are selected, taught, and practised as exercises; and power when developed takes the form of some action or exercise due to muscular contractions. Viewed thus, muscular exercise is at once a means and an end of mental, and moral, as well as of physical training; since without bodily actions we have no means of giving expression to mental power, artistic feeling, or spiritual insight. Without muscular tissue we cannot live or move.

It behooves us then, at the outset, if we wish to discuss intelligently the means of securing the ends of physical training, to consider somewhat closely the nature and proper effects of muscular exercise. We need consider here only such muscular tissue as is found in the voluntary muscles, which constitute nearly one-half of the human body by weight. Contractility, the distinctive endowment of muscular tissue, has its seat in the protoplasmic contents of the muscle cells. The amount of motion

which is transmitted by a contracting muscle to the bones of a joint — or whatever parts of the body the muscle is set apart to set in motion — depends upon the number and arrangement of its component cells. These muscle cells are sausage-shaped bodies, varying from $\frac{1}{800}$ to $\frac{1}{100}$ of an inch in diameter, and are seldom more than $1\frac{1}{2}$ inches long. The cell protoplasm is contained in a tubular sheath of tough, elastic, connective tissue, and is closed at both ends. Sarcolemma is the technical name given to this sheath. The sarcolemma has a single opening, through which the essential central strand — the so-called axis cylinder of a nerve fibre — finds its way into the muscle fibre or cell. The terminal portion of the nerve fibre spreads out under the sarcolemma, forming a flat protuberance known as the motor end-plate, and then ramifies in fine fibrils throughout the contractile cell-substance. At its hither, or central end, the axial fibre of the nerve is continuous with the irritable gray matter of a nerve cell. We have, then, the contractile substance of the muscle cell connected with the irritable stimulus-generating and transmitting substance of the central nerve cell, the connecting link being the axis cylinder of the muscle or motor nerve, which cylinder is simply a portion of the nerve cell's irritable contents long drawn out, in the form of a strand (which is protected and insulated by appropriate sheaths which we need not here describe) until it reaches the muscle fibre, in which it takes the form of the end-plate and its ultimate fibrils. What is true of a single muscle fibre is true of all the fibres of a given muscle; and what is true of one voluntary muscle is true of the entire five hundred. Voluntary muscles have sensory as well as motor nerve fibres. They are channels for the impulses which give rise to muscular sensibility, and are connected with centrally situated nerve cells which minister to our muscular sense, — the sense, that is, which keeps us informed concerning the condition of the muscles, and the extent to which they are contracted.

Under normal conditions the muscle cell shortens only when it is stimulated through the discharge of some portion of the energy of a motor nerve cell into it. Muscular contractions are therefore dependent upon the action of the nerve cells in

which they are initiated and controlled. Without dwelling upon the details of structure presented by muscles and their nervous connections, it is sufficient to recall to mind that a single muscle is a vast aggregation of contractile cells, arranged in myriads of linear series called fibres, which in turn are gathered into packets, technically termed fasciculi; that muscle arteries and veins usually lie alongside of each other amongst the fasciculi, while their capillaries form a fine mesh-work lying between and upon the fibres and cells, without penetrating the sarcolemma of any cell; that the walls of the capillaries are permeable to lymph, as the fluid portion of the blood is called, so that muscle fibres are enabled to derive their food-supply from the lymph in which they are bathed; that fibres and fasciculi, together with their accompanying nerve fibres and nutrient blood-vessels, are supported and bound together by elastic connective tissue; and that the muscle so made up has its own special sheath and is bound by inelastic tendons to the parts which are approximated through its action.

The effects of exercise upon a muscle and its nervous connections now demand our attention. Immediately a muscle begins working, under whatever stimulus, the blood stream passing through it becomes changed. The arterial twigs dilate; more blood is poured into the capillary vessels which surround its fibres; and more blood flows away from it, through its veins, towards the heart. If the supply of arterial blood to a muscle is cut off or diminished, its irritability is lowered; *i.e.*, a stronger stimulus is required to make it contract. The same result follows also, if it is fed with blood deprived of oxygen, or otherwise poisoned; or if the muscle vein is tied and the waste products, normally drained off through the veins, are retained in the muscle. The irritability of a muscle is also lowered by prolonged or excessive stimulation, even when its in-going and out-going blood streams are unobstructed. These, then, are the main conditions for the health of a working muscle: a full supply of proper food and of oxygen, unimpeded and sufficient drainage, and rest at due intervals. Given these three conditions in the body, and exercise of a working muscle causes it to increase in size and weight, through an increase of the size and

number of its fibres. Furthermore, a working muscle differs from a resting muscle in that it is appreciably hotter; by the presence of a low murmur, called the muscle sound; and on account of certain electrical peculiarities which it presents. Now a healthy muscle habituated to exercise, a trained muscle, that is, can do more work, and do it better, than an unexercised muscle, and for two reasons. Exercise makes the muscle larger, harder, and stronger, improving it simply as a tool in all its structure; and secondly, the muscle responds more quickly and fully to the stimuli by which it is stirred up to work. In other words, the muscle becomes more responsive and obedient to its stimulators, the nerve centres, through its better acquaintance with them. Growth, or increase in the size and number of its structural elements, and development, or increased facility in its functional activity, are the main effects of exercise in the case of a single muscle. The same is true of the muscular system as a whole. Exercise enlarges and strengthens it on the one hand, and renders it more readily discriminative and responsive as regards stimuli, on the other.

Muscular activity, too, is one of the chief agents in promoting wholesome tissue changes in all of the bodily organs, and determining the normal growth and development of the organism as a whole. The normal growth and balanced working of the organs concerned in the digestion and assimilation of the food; the circulation and oxygenation of the blood; and the secretion and excretion of waste or noxious products of tissue changes, are all largely promoted by well-regulated muscular exercise. The influence of exercise in these respects, and in securing the full and symmetrical growth of the bones and muscles is somewhat generally, though vaguely appreciated, and constitutes the burden of eulogy and exhortation of most of the articles and addresses of those who advocate physical training.

The nervous element involved in muscular exercise is oftener overlooked or neglected than recognized and set forth. Maclaren, whose book on "Training in Theory and Practice" is the best of its class in English, defines exercise as "muscular movement" simply, and declares its object to be the "destruction and renovation of tissue." This is the ordinary view, from which you

will find but little deviation. "We seek in vain in most physiological text-books," says Du Bois Reymond, Professor of Physiology in the University of Berlin, "for instruction respecting exercise. If it is given, only the so-called bodily exercises are generally considered, and they are represented as merely exercises of the muscular system. Therefore it is not strange that laymen in medicine, teachers of gymnastics, and school teachers believe that. Yet it is easy to show the error of this view, and demonstrate that such bodily exercises as gymnastics, fencing, swimming, riding, dancing, and skating, are much more exercises of the central nervous system, of the brain and spinal marrow. It is true that their movements involve a certain degree of muscular power, but we can conceive of a man with muscles like those of the Farnesian Hercules, who would yet be incompetent to stand or walk, to say nothing of his executing more complicated movements."

The arm of the blacksmith has been brought into play so often, by writers and talkers upon exercise, that every school boy credits the statement that muscles grow larger, harder, and stronger when duly exercised, and become weak, flabby, and wasted if they are suffered or forced to remain inactive. It is less obvious, though it can hardly be doubted, that use and disuse work similar effects in the case of nerve cells and fibres, both sensory and motor. There is abundant evidence, though much of it is of the negative sort, to show that the exercise of the muscles not only reacts upon the nerves and centres with which they are connected, in such wise as to enhance the power and ease with which they originate and transmit stimuli, but that it also leads to an increase in the size, number, and elaboration of their parts. But this evidence is chiefly to be sought in the writings of those who have made the normal and diseased conditions of the nervous system their special field of study; since text-book makers and the writers of popular articles seldom make use of the material which has been accumulated by professional physiologists, and those who devote themselves to the study and care of the idiotic, the paralyzed, and the insane.

The fact should never be lost sight of that a single muscle is not a simple organ, but is made up of two clearly distinguish-

able, though conjoined, mechanisms: a contractile, executive mechanism, the muscle proper, and a stimulating, regulative mechanism consisting of nerve fibres and gray-matter nerve cells. Each mechanism has its blood-vessels for supplying food and drainage; and the amount of blood supplied to each is proportionate to its functional activity. If in life the two mechanisms become dissociated, or if either suffer from mal-nutrition, unregulated exercise, or structural depravity, the dual organ is thrown out of gear, and its working becomes disordered or abolished in much the same way as in a human being, when it is attempted to split him into a mental part and a bodily part, and to train the dissevered fractions to functionate as entities. Muscular action is then a resultant effect due to the balanced working of the conjoined mechanisms alluded to. The nervous mechanism is concerned in a somewhat higher kind of work than that of its merely muscular colleague, and may be said to represent the movements of which the latter is the seat and instrument. Between the nervous arrangement which represents the twitch of a single muscle inserted into the base of a hair follicle, and that which represents and governs the varied and rapid muscular adjustments which characterize the hand and fingers of a cunning craftsman or artist, there exists every grade of complication.

If we compare an adult man and one of the highest of the lower animals, in respect of the movements of which they are capable, we find that they possess many in common, such as those of locomotion, respiration, and the like, but that man is distinguished from the brute by certain movements such as those involved in maintaining the erect posture, and in the action of the hands and vocal organs; and that, corresponding to these two classes of movements, there are two classes of nervous mechanisms by means of which they are represented. These mechanisms have been well termed fundamental and accessory respectively.

Similarly it is demonstrable that while the human infant and adult possess many nervous mechanisms identically alike in structure and function, the adult is characterized by certain other mechanisms whose structural peculiarities, connections,

and powers have been evolved and superadded as the result of growth and training. The law of evolution, as applied to the nervous system, is now very generally recognized by neurologists. In Ross's "Diseases of the Nervous System," for instance, this law, which was originally enunciated by Herbert Spencer, is described as "a progressive integration, both of structure and function, during which there is a passage from the uniform to the multiform, the simple to the complex; from the general to the special. The nervous system of man is at first similar to that possessed by all animals which possess a nervous system, or, at any rate, all those which are sufficiently elevated to possess a spinal cord; but as development proceeds, the nervous system of man becomes differentiated from that of an ever-increasing number of the lower animals, while still maintaining a general likeness to the nervous system of the higher animals up to the time of birth. This, then, constitutes the fundamental portion of the nervous system of man; but after birth the accessory portion which, up till this time only appears in a rudimentary condition, now undergoes progressive development. It will then be seen that the fundamental portion is first developed, and that the superaddition of the accessory portion greatly increases the multiformity, the complexity, and the speciality¹ of the human nervous system, and that it is the latest product of its evolution."

There are certain areas in the gray matter of the fore-brain of man whence proceed, it is now generally held, stimuli to the most important groups of voluntary muscles. In one of these regions are the centres which control the different groups of muscles of the upper extremity; and for the sake of simplicity we may consider that the centres of the muscles which move the shoulder, elbow, wrist, and fingers lie near to and are connected with one another. The movements of the shoulder and elbow, as well as those of the trunk, are fundamental and well organized in the infant, as compared with those of the wrist and fingers, which are accessory, and later acquired. In order that the movements of the different segments of the fore-limb should be properly co-ordinated as to force, direction, and degree,

¹ The word is so spelt in Ross.

their motor centres must habitually discharge their stimuli in due sequence and degree. This comes only through practice. Experiments on young puppies show that their motor areas are not sufficiently developed, until they are ten days old, for them to make voluntary movements with their limbs. Ferrier declares that "the degree of development and control which a puppy reaches in ten days or a fortnight is not attained by the human infant under a year or more." The infant, through the growth and development of the appropriate accessory centres, first gains control over its foot and leg, then over its arm and hand, and, later, over tongue and lips. It is evident that the arms of a blacksmith, and those of a five-year-old boy, and of an infant differ greatly as regards size, strength, and skill; but the essential differences which exist between them reside in the nervous mechanisms which represent the movements of which their respective muscles are capable, rather than in the muscles themselves. Not only are the motor nerves of the blacksmith the largest, but the cells in his motor areas are also more numerous, larger, more branched, and more widely connected with other cells. Exercise plays, if not the predominant, at least a very considerable, part in producing this result; and the still more important result, viz., that the motor centres of the blacksmith discharge their stimuli more directly, steadily, accurately, and tirelessly into their appropriate muscles than do those of his apprentice. It is hardly necessary to show, though it could easily be done, did time permit, that the organs of special sense and the sensory centres are similarly affected and improved by exercise.

The obvious effects of exercise are at once seen, if one compares the right and left arms of the average blacksmith with one another. It is well known that the centres which control the right hand are situated in the cortex or outer layer of gray matter of certain portions of the left fore-brain; and that those which control the left hand are in the right fore-brain. Flechsig, who has made exhaustive studies as to the course and number of the motor fibres which connect the muscles of the two extremities with their respective main centres, concludes that the number of fibres going to the right hand is, to the number of fibres going to the left hand, as three to two.

The mere disuse of a muscle causes it to diminish in size. This wasting is technically called atrophy. The most extreme forms of muscular atrophy and paralysis are due to diseased conditions which originate in nerve centres or nerve fibres, though to the uninstructed eye the muscles would appear to be the only organs affected. Lesions in the central nerve system may cause the bones to atrophy, as well as the muscles. The development of a group of muscles, of an entire limb, or even of one side of the body, may be arrested by reason of certain forms of central nervous disease which occur in infancy and childhood. Observations made upon the brains of persons born with an arm or hand lacking, taken in connection with those made upon the brains of persons who had had an arm or hand amputated, go to prove that the suppression or considerable diminution of certain movements brings about a condition of atrophy, or arrested development, as the case may be, in those centres which would normally represent such movements. One may attain to the stature and semblance of manhood, and yet, by reason of the arrested development of certain of his motor centres, be nothing better than an infant, or a mere animal, as regards his powers of action: while epilepsy, paralysis, and atrophy may reduce a man, stage by stage, to the condition of an untrained child, or of a helpless idiot, or even to that of a living corpse.

The functional improvement of the nervous mechanism which represents any movement, whether it be simple or complicated, reflex, automatic, or voluntary, is the most important effect of muscular exercise; or, in other words, muscular training which fails to develop brain power, falls short of its aim. It is not altogether clear just how it comes about that, through trial and repetition, an action which is at first a difficult or impossible feat becomes a pleasurable accomplishment, then a routine performance, and at last an almost instinctive act. But there is a settled conviction among those who know most about healthy and diseased nerves, that the frequent or habitual passage of stimuli from a given group of cells through definite fibres to the muscles concerned in a given movement, leads to some kind of a rearrangement of the molecules composing the irritable

protoplasm of fibres and cells, so that less and less resistance is offered to the passage of subsequent impulses from the same source. Somehow or other the memory of past actions and the stimuli which evoked them becomes imbedded or organized in the motor centres. His once too vividly impressed sensory centres cause the burnt child to dread flame; and the difficulty of interesting an old dog in new tricks, except so far as he delights to criticise and decry them, arises from the preoccupation of his centres by old impressions, rather than from their increasing insusceptibility to fresh ones.

From careful studies made as to the character of the dreams of the blind, it appears that the memory of visual objects is not organized until between the fifth and seventh year of life. Persons born blind do not dream of objects in the outer world; and those who become blind before attaining their fifth year do not dream of objects seen by them before their loss of sight. They are blind-minded as well as blind-eyed as regards such objects. There are authentic cases recorded of persons whose memory of objects — seen before the access of their blindness — persisted for twenty, thirty, and even fifty years; then the record of their visual impressions became effaced, and they ceased to dream of objects in the outer world. The case of a man born without either hands or feet is in point here. Although he had eyesight he did not dream of executing hand or foot movements; yet he had sufficient use of his stumps to write what is termed "a good hand." There was no record of hand or foot movements in the centres which ordinarily control such movements; so that he was unable to dream of movements which he had never executed. On the other hand, the instances are very numerous in which men, who, having lost a limb by amputation, could feel their fingers or toes while awake, and dream in sleep, or when awake, of making complicated movements with their lost members. "Persons who have had an arm amputated," says Dr. Weir Mitchell, "are frequently able to will a movement of the hand, and apparently to execute it to a greater or less extent. A small number have entire and painless freedom as regards all parts of the hand." They must be blind-minded, indeed, who can deny in the face of such facts

that muscular exercise plays a part in the development of brain power.

"The muscles," says Dr. Crichton-Browne, an eminent English writer on insanity and kindred diseases, "not only, by the locomotion which they render possible, widen the field from which our sense impressions are gathered, but also by the experiences which their own activities involve, expand our mental resources a thousand fold. An analysis of our ideas at once reveals to us that we have few that are of purely sensory origin ; our ideas of form are not mere revived optical impressions, which are properly limited to color, but ocular impressions combined with ideal ocular movements. Our idea of a circle is a combination of an ideal colored outline with an ideal circular sweep of the eyeballs, or it may be of the tactile impressions coinciding with an ideal circumduction of the arm or hand, or perhaps both these factors combined. And so it is with our ideas of weight, distance, and resistance, which all involve sensory and motor factors ; and to revive in memory any such ideas is to revive both the sensory and motor elements of their composition, and to repeat definitely in certain nerve centres the processes which correspond with certain motor acts."

Now the centres of motor ideation require to be exercised in order that they may be properly developed, and may contribute usefully to mental processes ; and hence muscular training is likely to assume a more important and precise place in our educational systems of the future than it has done hitherto. The defective exercise of any group of muscles during the growth period of its own particular centre will result not only in the dwarfing of that centre, but a corresponding hiatus or a general weakness must exist in the whole mental fabric.

From this we might deduce that swaddling bands so applied at birth as to restrain all muscular movements, and kept on during infancy and childhood, would result in idiocy—a speculation to which the wretched muscular development of most idiots and imbeciles, and the fact that their mental training is most successfully begun and carried on through muscular lessons, give some countenance. We should also have to infer, that in order to hold up a sound and vigorous brain, we must

insure free exercise to the different groups of muscles in the order of the development of their centres, and must in no degree interfere with the natural sequence of their evolution. That being so, we must necessarily ascertain what that natural sequence is which is so important a guide to education ; for, in our present ignorance of it, we may unwittingly be doing much mischief.

Suppose that we are encroaching on the time at which hand centres ought to receive their most valuable education, — their nascent period, — and are devoting that time to the cultivation of the tongue and lip centres, then we should be impairing the full development of the brain ; for the hand-controlling centre, if not fully exercised at its nascent period, can never afterwards attain to the highest cunning. But it seems that not only tongue but hand, and foot, and eye, and arm, and every muscle of the body, must be trained in due season, if education is to do what we expect of it, and result, not in headaches, and imbecilities, and nervousness, and insanity, but in well-balanced growth of body and mind.

It seems to me evident that muscular exercise deserves more attention than educators in this country have ever been willing to give it, and that when properly chosen, regulated, and guided, it may make a boy into a better man, in many respects, than his father was, and enable him to transmit to his progeny a veritable aptitude for better thoughts and actions. Herein lies the power of the race for self-improvement, and the evolution of a higher type of man upon the earth.

“ I do not think,” says Bagehot, in his “ Physics and Politics,” “ that any who do not acquire this notion of a transmitted nerve-element will ever understand the connective tissue of civilization. We have here the continuous force which binds age to age, which enables each to begin with some improvement on the last, if the last did itself improve, which makes each civilization, not a set of detached dots, but a line of color, surely enhancing shade by shade. There is by this doctrine a physical cause of improvement from generation to generation, and no imagination which has apprehended it can forget it ; but unless you appreciate that cause in its subtle materialism ; unless you

see it, as it were, playing upon the nerves of men, and age after age making nicer music from finer chords, you cannot comprehend the principle of inheritance, either in its mystery or its power."

We have seen that the effects of exercise upon a single muscle are chiefly two. On the one hand, there results a general condition which may be termed the heightened health of the neuromuscular machine, which state of health involves the attainment and maintenance of a normal degree of size, strength, and working power in its structural parts; and on the other hand, a more complex and special effect, viz. the acquisition or organization by its neural parts, of proper habits as regards the origination, transmission, and regulation of stimuli. The ends of exercise may then be characterized as the promotion of health and the acquisition of correct habits of action. The first is a hygienic end, while the second is a distinctly educational end. It matters not whether we consider a single muscle, which admits of only a single limited motion, or a group of muscles, or the communal structure we call the human body, or a class of school children, or a regiment of soldiers; the ends of exercise in each case are the same and can only be attained by a combination of hygienic and educational measures.

The main field of education is, then, the nervous system, and the especial province of physical training is found in its accessory portions. The principles of all forms of physical training, however various and divergent their special ends may be, are based upon the power of the nervous system to receive impressions and register them or their effects; in other words, upon its ability to memorize the part it has played in acquired movements, and on occasions to recall and revive such movements.

It is coming to be clearly recognized that the function of our public and preparatory schools and colleges is not to fit their scholars to engage as specialists in either intellectual, commercial, or industrial pursuits. The same rule holds good as to the kind, or, rather, degree of physical training which should be aimed at in our schools and colleges. It is not their business to train up ball-players, carpenters, clerks, or professionals of any kind. General bodily training is the kind demanded; but

training so general that it is vaguely, or spasmodically, or half-heartedly carried out, or worse still, that is left to run itself in accordance with the whim or frenzy of the persons to be trained, will surely and deservedly fall short of success. Intelligence, system, organization, funds, and patience are just as imperatively required in physical training as in the training of engineers, musicians, or philologists.

The law of the evolution of the nervous system seems to me to furnish a sufficient criterion by which to estimate the worth or success of any scheme or system of physical training. Any system that does not provide first of all and continuously for the training and exercise of the central or fundamental groups of muscles will fail utterly in securing either the hygienic or the educational end of exercise; and any system which substitutes training of the accessory neuro-muscular mechanisms for that of the fundamental ones, or which exacts undue work of undeveloped accessory centres, or attempts their training out of the proper order of their ripening, is bound to contribute more towards the promotion of brain forcing than towards its prevention.

The most fundamental mechanisms of the trunk are those which are concerned in the movements of respiration and of circulation. They are quite fully organized at birth: but the need for their exercise ceases only with the life of the organism. The centres which represent the muscles by means of which the trunk is kept erect and balanced upon the pelvis are accessory, if compared with those mentioned above, but are fundamental as compared with those which represent the muscles of locomotion. The muscles of the trunk are called into fuller and more frequent play as soon as the child ceases to go on all-fours, and it must then learn, after a fashion, which may exigently demand correction or further training later on, to co-ordinate the movements of its limbs with those of its trunk. The child learns to flex its thigh upon the body, the leg upon the thigh, and to elevate the heel from the ground considerably earlier than it can raise its toes, so that the foot shall swing clear of the ground and it be enabled to begin another step. What folly it would be to try to teach a toddling infant to run, or jump, or dance!

Similarly the training of the hand and fingers should not only be preceded, but accompanied by the exercise of the muscles of the forearm, arm, shoulder, and trunk. You shall not gather ripe manual cunning from a limb whose trunk attachments are undersized, untrained, or deformed. This fact points to the danger of exacting genuine manual training from young pupils, especially if it be divorced from its proper adjuvant and corrective general gymnastics. It is simply impossible to make any technical drill, such as wood-turning, penmanship, singing, piano exercises, or even the manual of arms, meet the proper ends of bodily education either for children, adolescents, or adults. Technical training, appealing as it does to the most accessory mechanisms, should be grounded on general hygienic and educational training; should not be pushed at too early a stage; and should be left, where it belongs, in the hands of special trainers.

Pastimes, out-of-door sports, and systematic gymnastics are the forms of exercise which yield the best results in the physical training of school children and college students. The plays of the kindergarten, the athletic sports to which British and American youth are so devoted, and the systematic gymnastics of the Swedes and Germans have all developed from one germ, from healthful play, that is; the vital energy of this germ is found in the universal and ineradicable impulse of all healthy children to play. The children of every generation, no matter how prim, or sour, or ascetic their parents may be, are always playing animals. That it is so is a most fortunate thing for the race: were it not so, the victims of war, pestilence, and education, and of that voracious monster that men call business, would be vastly more numerous than they are.

In the athletic sports of young men we see the highest and fullest expression of the play instinct. The essential difference between athletics and gymnastics is one of aim. The aim of athletics, unless of the illegitimate professional sort, is pleasurable activity for the sake of recreation; that of gymnastics is discipline or training for pleasure, health, and skill. We have but to compare the aims, methods, and results of each, and to call to mind the characteristics of the nations which have

affected athletics on the one hand and gymnastics on the other, to perceive that gymnastics are more highly developed, and present more features of educational value. Gymnastics, as compared with athletics, are more comprehensive in their aims, more formal, elaborate, and systematic in their methods, and are productive of more solid and considerable results.

I have no disposition to disparage athletic sports. I would that they were more general and better regulated than they are in our country. I believe that they are valuable as a means of recreation; that they conduce to bodily growth and improvement; and that their moral effects are of value, since they call for self-subordination, public spirit, and co-operative effort, and serve to reveal the dominant characteristics and tendencies, as regards the temper, disposition, and force of will of those who engage in them. But they bear so indelibly the marks of their childish origin, they are so crude and unspecialized as to their methods, as to render them inadequate for the purposes of a thorough-going and broad system of bodily education. It is well to promote them, and it is becoming increasingly necessary to regulate them; but it is unwise and short-sighted to consider them as constituting anything more than a single stage in the best bodily training.

Gymnastics have been most popular and general among the most highly trained nations, such as the Greeks of old and the Germans of to-day. The most athletic, and, at the same time, one of the most ill-trained of modern nations, is the British. I mean simply this, that an Englishman believes, and acts upon the belief, that you come to do a thing right by doing it, and not by first learning to do it right and then doing it; whereas, the Germans leave little or nothing to the rule of thumb, not even in bodily education. German gymnastics embrace three well-marked fields or departments; viz., popular gymnastics, school gymnastics, and military gymnastics. The organization of the last two departments is maintained and controlled by the government for strictly educational purposes; while the Turnvereine, as the popular gymnastic societies are called, are voluntary associations of a social and semi-educational but wholly popular and patriotic character. The fondness of the German

people for gymnastics is as marked a national trait as is the liking of the British for athletic sports. The German system of gymnastics has been most highly developed in Prussia, where not far from a fifth of the population is undergoing systematic physical training at the present time, under the combined agencies of the schools, the army, and the Turnvereine. In Switzerland and in Norway and Sweden, you will find school and military gymnastics, especially in Sweden, quite as fully developed as in Germany, and popular gymnastics not so much so.

One of the main defects of our school training hitherto is found in the fact that lessons and tasks are set which involve the activity of the accessory parts of the nervous system, before its fundamental portions have been properly built up and trained. The result of this inverted and unnatural order of teaching is seen in myriad forms of nervous disease which find expression in St. Vitus' dance, grimaces, spasms, convulsions, and other forms of disordered muscular action, as well as in the protean forms of headache, nervous exhaustion, and mental derangement, so common nowadays amongst sedentary people and brain-workers. For the purpose of forestalling such results, I would encourage games for boys and girls during their school life; and would require of them compulsory attendance upon instruction in gymnastics, drawing and modelling, and in the elements of certain selected handicrafts for general educational purposes. Physical training has long been recognized as an indispensable means for awakening and developing mental faculty in idiots; and has been employed with astonishing success, for several years, in the training of criminal dullards in the State Reformatory at Elmira, New York. Did time permit, it would be interesting to consider the methods and results of teaching gymnastics to idiots and criminals. I must content myself with referring you to the writings of the late Dr. Edward Seguin, of New York, the reports of the managers of the Elmira Reformatory, and the brochures of Dr. H. D. Wey.

My plea is, that inasmuch as physical training enters of necessity into the training of every school child, every apprentice, every recruit, those who undertake to train scholars or craftsmen, artists or authors, should see to it that mental train-

ing should not be pursued to the neglect or detriment of bodily training; that each kind of training should be given its proper place in the compulsory curriculum of our public schools; and that bodily training should be given in appropriately fitted places, by specially trained and well-qualified teachers, in a systematic, well-ordered, and rational way.

It is not within the scope of this paper to set forth the lessons to be learned from the best European systems of physical training, or to show how fragmentary and defective our so-called American systems have been and are; but I may remark, in passing, that a careful study of the German and Swedish systems of school gymnastics will be found an indispensable preliminary step for those who propose to organize a natural, rational, safe and effective system of American physical education.

The price of wisdom may be beyond that of rubies; but the price of health, which Plato conceived to be the natural order and governance of one another, in the parts of the body, its price is above that of either gems or wisdom.

A paper on "The German System," by Heinrich Metzner, of the New York German Turnverein, was read, in his absence, by Mr. Carl Eberhard, Superintendent of the Boston Athletic Club Gymnasium.

THE GERMAN SYSTEM OF GYMNASTICS.

BY H. METZNER,

PRINCIPAL OF THE SCHOOL OF THE NEW YORK TURNVEREIN.

THE desire to improve or to attain a higher standard in culture and civilization, natural to almost every human being, is the cause of all education, its aim is the perfection of mankind, and its means are the gradual development of all faculties, mental and physical, by instruction, example, and exercise.

Education should therefore strive to avoid a partial or one-sided development by preferring either body or mind at the expense of the other, or to strain any one faculty to great proficiency and thus destroy and disturb the harmonious activity and co-operation of both mind and body.

This maxim, however old and often demonstrated, has not yet gained that public recognition which is necessary to secure its practical application in the schools of this country.

As gymnastic exercises, we denote all bodily exercises and movements produced by the controllable muscles with consciousness and intention, for the purpose of developing all bodily faculties in an agreeable manner, and at the same time of bringing out all those qualities which are the natural result of health and strength; namely, courage, self-reliance, and joyfulness.

A gymnastic system we may call the scientific combination of the gymnastic exercises, based on physiological laws, their classification, and the instruction of their practical application.

A method is the application suiting the different wants as to sex, age, bodily condition, and health.

The system is based upon the knowledge of the human body, its divers organs, their relative functions, and of the laws of anatomy and physiology. The method is the result of practical experience.

The German system of gymnastics ranks high among all the different systems known. It is not an experience of late years, like so many others which have been put forward with great promises and pretensions by their inventors, in order to meet the want of bodily training in our present school education, which, however, have been laid aside again after a short trial on account of their insufficiency. The German system has been diligently built up during almost a century by men of science, especially physicians, physiologists, and pedagogues of high reputation. It is in practical use since that time, and is to-day in vogue in many European countries, in a more or less modified form. In the army, as military gymnastics; in the education of the youth, as school gymnastics; in the halls of the German turners, as popular gymnastics.

It is practised in classes by hundreds at the same time, as well as by single individuals as home exercises.

The German system embraces all the different branches of gymnastics: exercises with apparatus, light gymnastics or calisthenics, and also all those exercises known as out-door sports, as running, leaping, jumping, throwing the stone and the use of all hand-apparatus, as wands, dumb-bells, and clubs.

The German system has three marked features which no other system can claim in so predominant a manner.

I. It aims at general physical culture, and not at the culture of one special branch. Therefore it declines the development of a certain organ or faculty at the expense of others. In regard to this we may call attention to the fact that all who have gone through a regular course of exercises in accord with this system have been thoroughly developed, and rank as high in proficiency as any person educated by another system. The contests among the turners are thus arranged, that exercises in all the different branches must be performed. This is also the case when testing scholars in regard to their proficiency. The numbers gained, added together, decide the grade of develop-

ment. The strife for specialties is even not permitted, and a partial or one-sided development is therefore unknown. Yet this does not prevent individual skill and inclination from bringing about a greater result in a certain branch ; this result, however, is not gained by a loss or lack in any other branch.

II. It allows, or rather, induces the exercises in classes. The classes are selected by a careful investigation as to strength, ability, age, etc., and for that reason it suits as well those who practise merely for physical development as those who aim at a proficiency of a higher grade. The exercises in classes are a source of endless pleasure, refreshment of mind, and joyfulness not only to children, but even to adults. They are furthermore an inducement for promotion and the ambitious desire to keep step with other scholars. They act as a stimulant for greater exertion. It is an undeniable truth that all those who have continually practised in a German gymnasium, or in a school in which the German system of gymnastics had been introduced, acknowledge that the hours spent there count among the happiest of their childhood or manhood. The variety and great number of exercises of the German system and their scientific arrangement allow new and indefinite combinations. The teacher can always select a certain number of exercises suitable for his class which are as agreeable as instructive and interesting to every one of the classmates. Not only the body, but also the mind is kept in a wholesome and refreshing activity which will keep away all weariness and tediousness which are so often found in other systems. The class exercises of the German system allow also the instruction of a large number at the same time, providing sufficient room is at hand.

III. The instruction begins with the most simple and easy movements and proceeds gradually to a higher degree. All fear of danger or harm to the body is *a priori* excluded. The apparatus used in school practice is not at all complicated or expensive. A number of climbing-poles, ladders, and some light apparatus for the high and long leap are sufficient. They may even be omitted altogether if the necessary room for such could not be provided for. In this case, however, we cannot call the training a complete one, as the aim of training is not

only the achievement of a development of muscles, limbs, and organs, but also the achievement of courage and self-reliance. It is a fact that many a man or woman could have avoided danger or saved their lives had they been courageous or resolute enough to risk a leap or to take hold of a ladder in a moment of need.

The great variety of useful exercises that may be made with the above-named apparatus, together with the utilization of the almost endless variety of simple and complicated free exercises, with or without the common hand-apparatus, as wands, dumbbells, clubs, etc., which may be executed in the schoolroom, bring about as satisfactory results as any other system. In addition to this we may proudly assert that its *scientific* and educational value has met with approval wherever it was allowed a fair trial. And we also may assert that no other system has so large a variety of exercises and combinations as this. And for that reason alone it is more qualified for introduction wherever gymnastic exercises are wanted, especially in the schools.

The German system is not in vogue only in the halls of the turners and in their schools. It has already gained its ground in some of the colleges and athletic clubs, in private and in public schools, where teachers educated in the seminary of the North-American Turnerbund act as instructors.

The German system does not claim to have any special exercise of its own, or to be the sole proprietor of any, that no other system may also produce; no. But it may properly claim that it has *correctly* and practically arranged the gymnastic material for the use of any one who seeks health, strength, or refreshment of mind and body.

In the German gymnasias and schools the lessons begin regularly with a series of free and order exercises. Every scholar has to participate in them. The rhythmical order in which they are produced calls forth absolute attention, and allows no backwardness. They impress on each a feeling of responsibility toward his associates. The mistakes or errors, or an insufficient execution of any one, injures the good impression of the whole, and thus tends to greater carefulness and prevents negligence on the part of the scholar.

Class exercises on apparatus follow the free exercises. A change of apparatus takes place, and then the lesson ends with some exercises left to individual inclination. The latter, however, are limited to a short time according to the ability of the scholars, or may be prohibited altogether to beginners. Thus under the eye and control of the teacher a scene of activity and liveliness is exhibited, which the educator will look upon with satisfaction and delight.

In consideration of the above-stated facts a careful examination and a fair trial of the German system of gymnastics, free of all prejudice, may properly be demanded when the question is practically to be decided which of the different systems is best apt to be adopted in the programme of our public schools. The German system has not been influenced by any other. Since the days of Guts-Muths, Jahn, and Eiselen, the founders of German gymnastics, and Adolph Spiess, the founder of the elaborate structure of school gymnastics, it has had material enough to give freely from its wealth to other systems, and many of the latter boast features of German origin. May the decision of the question be based on a fair and close examination. Neither this paper, which states but a few points of merit of the German system, nor a short exhibition of exercises by scholars is sufficient to show the educational value of it.

But whatever the result of this agitation may be, let us hope that wise and cautious observation and study, uninfluenced by prejudgment or prejudice, will bring about the decision.

Allow me to close this brief sketch with the remarks of Dr. Edward Mussey Hartwell of Johns Hopkins University in the "Circular of Information," written in 1885 for the National Bureau of Education.

He writes: "If physical training should ever be pursued intelligently and systematically in the schools of any American state or city, many of the same problems with which the educational authorities in Germany, Switzerland, Sweden, and France have been so deeply engaged inevitably present themselves." I am far from thinking that such problems can be satisfactorily solved by the attempted introduction of any unmodified foreign system of gymnastics or athletics. But I am firmly convinced that

whoever may be impelled or called upon to attempt to provide an adequate remedy for the present lamentable neglect of physical training in American schools and colleges can readily save money, time, and trouble if they will but study the German system of turning; "for there can be no doubt," to borrow the words of Professor Du Bois-Reymond, "that German turning, in its wise mingling of theory and practice, exhibits the happiest, yes, the most adequate solution of the great problem with which pedagogues have been busy since Rousseau,—a truth which, after a short obscurity, is now hardly contested, but the physiological principle of which a few are beginning to understand."

DISCUSSION.

Dr. HARRIS.—The German movement is a movement which looks most to the conscious development of the muscles through the will. Over against it stands the English system of developing muscle unconsciously by athletic sports. I suppose we shall have the distinction between these two principles presented, and I hope their claims may be adjusted. It is an important question to decide whether we should make physical training a matter of special effort of the will, subordinating the will of the pupil to the will of the instructor, or whether we shall seek such physical training in free play from games. That is indeed the chief practical subject that we have before us now. I suppose that every one acquainted with medicine knows that physical training by the exercise of the will, instead of re-enforcing the vital processes, may thwart them and injure them. I know of chronic cases of dyspepsia, for example, that have never been cured by gymnastics; but there are certain kinds of voluntary and involuntary movements that certainly help digestion. It is known that horseback riding is beneficial, a favorable reaction being caused by the jolting movement of the horse. This is supposed to be especially a kind of exercise that helps the healthy action of vital organs. Some have contended that it is the best exercise for consumptive people. I call attention to this, not to indorse the theory, but to indicate one of the trends which I hope the debate will take. I call first on Dr. Hall of Baltimore.

Dr. Hall begged to be excused till after the paper on the Swedish system should be read, as that was the system in use in Baltimore.

The president called on Mr. E. P. Seaver, superintendent of schools in Boston.

Mr. SEAVER.—I came here to learn. I freely confess that I know very little about this subject, and it would be a piece of presumption on my part

to occupy the time. I will make one request, however, for further light. Dr. Hartwell, in his very interesting paper, quoted some well-known medical writers, and he mentioned one book from which, if I understood him aright, something might be learned about the proper classification of the nerve-centres and about the proper kinds of exercise to be applied to bring these centres into full development and activity. My hope was that before that paper was concluded we should have from him a little information as to the literature on the subject, so that laymen like myself and pedagogues like myself might be able to make up the deficiencies of our knowledge by reading as well as by listening to papers.

Dr. HARTWELL. — I am sorry to say that the literature in English upon systematic physical education is not very voluminous or satisfactory. The German and Swedish systems, although springing out of the exercises of the Turnvereins, have been moulded and built up as the result of a good deal of thought and effort on the part of educators and scientific men. The German system owed its start as popular gymnastics chiefly to the work of "Father Jahn," as he was called. He conceived the idea of using physical training as a means of bettering the youth of the nation, and making them strong, courageous, and able defenders of their country at the time of Prussia's deepest humiliation and trial. Before Jahn came Guts-Muths, who, enamoured of the Greek gymnastics, began writing about gymnastics for schools about a hundred years ago. He taught gymnastics for many years in Salzmann's Philanthropium in Schepfenthal.

But the gymnastic movement under Jahn was at first of a political rather than of a pedagogical character; and when the war of liberation came in 1813, the Turners were found, almost to a man, in the ranks of those who broke the Napoleonic yoke. That gave great popularity to the exercises, and paved the way for school gymnastics. The ideas and methods of Jahn still survive in many of the exercises used by popular societies known as Turnvereine. The consolidated Turnvereine constitute the organization known as the Deutsche Turnerschaft, which numbers between four and five thousand gymnastic societies in Germany and Austria, and has a membership of nearly four hundred thousand. The principle of the Jahn Turning was the doing the best one can according to bodily ability, under the lead of a more accomplished gymnast called a "Vorturner." It became necessary, later, to modify the methods of popular gymnastics in order to meet the more formal methods of school training. That was accomplished chiefly by Adolph Spiess, who was, like Jahn, a school teacher, but, unlike Jahn, not a popular agitator. Spiess wrote an elaborate book on the subject of school gymnastics. Jahn's book, or a portion of it, was translated into English by Dr. Beck, one of his pupils. This translation was published about 1828, in Northampton, Mass., when Dr. Beck was a teacher in the famous Round Hill School. Most of the German literature on this subject has not been translated. The same may be said of the Swedish literature. There are books enough on all branches of gymnastics in both of those languages, and in each of them you may find periodicals devoted to the interests of school gymnastics.

The physiological effects of exercise to which I have referred with most emphasis in my paper, are generally not touched upon in the hand-books put into the hands of medical students and the teachers of Turning, whether those hand-books be printed in German, Swedish, or English. It is only in the scattered writings of specialists that you will find anything approaching to an adequate exposition of the effects of muscular exercise upon the nervous system. In Ross's "Diseases of the Nervous System" the difference between the fundamental and accessory parts of the nervous system is clearly set forth, and the proper order to be followed in their training is alluded to. In "The Book of Health," edited by Malcom Morris, and published by Cassell & Company, you will find a valuable and original article by Dr. J. Crichton-Browne on "The Nervous System in its Relation to Education." The best general exposition of the whole subject is that given by Professor Du Bois-Reymond of the University of Berlin, in his "Physiology of Exercise," which appeared three or four years ago, in translated form, in the "Popular Science Monthly." But the criticism of gymnastic methods, German and Swedish, in just the light I have presented this morning, I do not think is to be found in any of the ordinary books. Certainly it is not in Maclaren's "Training in Theory and Practice," or the ordinary American and English text-books on physiology.

A good deal more than is given in Mr. Metzner's paper could be brought out in regard to the German system. The first attempt to introduce gymnastic training into this country was made by Dr. Beck and Dr. Follen, who had been friends and pupils of Jahn. The attempt was made in 1825, at the Round Hill School at Northampton, where Beck and Follen were teachers. But the inducements for them to become professors at Harvard College were greater than to engage in any crusade for gymnastics. Gymnastic apparatus of the German sort was put up on various college greens, and there was an enthusiastic outburst in schools and academies in favor of physical training. The interest was but superficial and shortlived. When the machines grew old or became warped by exposure to the weather, they were not renewed, and the interest died out. There were some doctors in Boston then who exerted themselves in behalf of gymnastic training. Dr. John C. Warren was the President of the Tremont Gymnasium, the first gymnasium of any size started in this country. That was in 1826, I believe. It is interesting to note that they made an attempt to get Jahn to come over and take charge of it. He was then in exile from the capital, and in political disgrace. Failing to secure him, they did secure Dr. Francis Lieber, the jurist and publicist of later days, who came to this country to teach swimming and gymnastics here in Boston. He took charge of the Tremont Gymnasium for awhile; but that gymnasium finally died a natural death, and Dr. Lieber's fame rests in his career as a publicist, not as a gymnasiarch. A large number of gentlemen, however, experienced benefit from that gymnasium,—men like Dr. Francis Gardner, Dr. John P. Reynolds, and others. It is also interesting to note that Father Jahn's son has lived for many years in Baltimore, and that the son of the latter is now one of the special teachers of gymnastics in the Chicago

public schools. The grandson was adopted by the North-American Turnerbund, and very largely educated at its expense.

A dozen years or so ago efforts were made to provide physical training for the boys in the Boston Latin School. Doubtless these efforts were due, in a measure, to the influence of the Tremont Gymnasium.

Then, just before the war, came Dio Lewis, who adopted a part of the German system, and invented bean-bags and rings, and substituted wooden dumb-bells for iron in class exercises. A part of his outfit was an iron crown for the head, which was decorated with the stars and stripes. He had a school of gymnastics, which lived at Lexington for a few years. I remember that Superintendent Philbrick said of the Lewis gymnastics, "the problem is now solved; here are exercises that can be used in the school-room without fixed apparatus." But it did not turn out so. I do not believe that you can introduce fully or satisfactorily either the German or Swedish systems of training, unless you have buildings or rooms fitted and furnished to meet their requirements. You may introduce free movements, such as we shall see here, which can be performed in the class-rooms, and you may accomplish great good with them. Such a movement, to do this, has gained already considerable headway in other parts of this country.

American educators have given so little attention to German gymnastics that I hope I may be pardoned for relating a personal experience here. Some years ago I had occasion to prepare a report for the United States Bureau of Education on this matter of physical training. In getting material together, I visited all the principal college and Christian Association and other gymnasia of the country. This brought me into many different cities. I had, too, at my disposal all the literature in the library of the Commissioner of Education in Washington; but I did not anywhere come across any allusion to the German system of Turning as it exists here, and has existed since 1848. No one even suggested a visit to a Turnhalle. It was only after I went to Germany, when I had completed my report, that I learned what the German-American Turners were doing, and what they had done. I was, fortunately, enabled to revise my report before it was printed. It is worth while to remember, in undertaking to do anything toward organizing the introduction of gymnastics into schools, that the German Turners in this country have maintained for many years a school for the teaching of teachers. The North-American Turnerbund, which numbers more than thirty thousand members, owns property free from debt worth more than \$2,000,000, including one hundred and sixty gymnasium halls, and libraries aggregating fifty-three thousand volumes. It has one hundred and forty teachers, who have graduated from its Normal Seminary, at the end of a well-considered course of training. The gentleman whose paper you have heard read, Mr. Metzner, and the gentleman who read it, Mr. Eberhard, and Mr. Groener, the teacher of the Boston Turn Schule, are graduates of that seminary. There are some fifteen thousand boys and six thousand girls in the Turn Schules of the North-American Gymnastic Association, who are regularly taught gymnastics by

approved German methods. This teaching goes on every week in New York, Boston, Milwaukee, St. Louis, and other cities, but so quietly that most educators pay little attention to it. I hold that the best-trained body of gymnastic teachers in this country, not excepting those engaged in our colleges, are those trained and maintained by the Turnerbund. The Turnerbund was founded by exiles from Germany. Their aims are not only those of which we have heard, but one of their aims is to discuss political, social, æsthetic, and ethical questions. For instance, the New York Turnverein maintains classes in drawing and modelling, and it also has a theatre, which its theatrical club and singing society use for their special purposes, and schools where upwards of nine hundred children are taught the German language and literature on certain days, and on other days have gymnastic and domestic training. The same Verein also has a cadet battalion of ninety boys, who are trained in target-shooting, as well as in the manual of arms. More than this, since 1885, the German system of gymnastics, as represented by the free movements, which are simple movements without apparatus, or light gymnastics in which hand-apparatus, such as wands, rings, and dumbbells, are employed, has made great progress in certain sections of our country. As a general thing, special gymnasiums have not been provided. The exercises are performed in the class-rooms. But it cannot be said that the system has been introduced as a whole. Neither it nor the Ling system can be fully adopted until specially fitted gymnasiums are provided. But in the courts of the school buildings, in the halls and school-rooms, free and light gymnastics have been introduced in the cities of Chicago, Kansas City, Milwaukee, Pittsburgh, Denver, Louisville, Keokuk, St. Joseph, Rock Island, Davenport, and in other Western cities. They have also been introduced, to some degree, I am told, into the schools of Holyoke, of this state, and of Orange, N.J. The school population of the towns and cities where this sort of gymnastics is in successful working I estimate to be about four hundred thousand. In Chicago they have fourteen special teachers who teach gymnastics, at salaries ranging from \$750 to \$1800. In many of the other cities instruction is given by a director of gymnastics to the ordinary teachers, who in turn instruct their scholars. Gymnastic exercise is obligatory in the schools of all grades in Kansas City and in Chicago. I had, not long ago, a letter from the chairman of the committee on physical culture in Chicago schools, saying that the system worked admirably, and to the satisfaction of the Board, the teachers, and the pupils alike.

Dr. HITCHCOCK. — I want Dr. Hartwell to answer the question as to the literature accessible on this subject, better than he has done. He was always a good boy in college, and I do not want to see him floored now.

Dr. HARTWELL. — If Superintendent Seaver will repeat his question, I will try to answer it.

Mr. SEAVER. — I was quite well satisfied with Mr. Hartwell's answer. It is always interesting to hear a man talk who is full of his subject. What I wanted specially to know was, what books there are from which one can get

a criticism or critical estimate of these different systems of gymnastics, having in view this classification of the nerve centres into fundamental and accessory, so that we may reach a more clear conclusion as to which is the better system.

Dr. HARTWELL. — I do not know of any. Very much of what I said was gathered from many quarters, from monographs and special works brought together by myself.

Mr. SEAVER. — Then Dr. Hartwell will have to write such a book himself.

Mr. DUNTON of the Normal School. — To what extent are gymnastics in the common schools in Germany taught by the regular teachers, and to what extent have they special teachers for this department? If we had proper rooms and proper apparatus, would it be practicable for the regular teachers to conduct the exercises?

Dr. HARTWELL. — German schools are divided into two classes. The higher sort leads to the University in the Technical School; they are the *Gymnasien* and the *Real-Schulen*. Most of these have special teachers of *Turnung*, who have received their training at a normal school for training teachers of gymnastics. There are such normal schools in all such capitals as Berlin, Dresden, Munich, and Stuttgart. In the lower, or primary schools, — the *Volks-Schulen*, — it is a more common practice for the pupils to be taught gymnastics by the ordinary class teachers. But these teachers have to learn to teach gymnastics in the normal schools where they obtain their professional training. The same holds good with regard to the Swedish schools. The higher schools for boys correspond to the German *Gymnasien* or *Real-Schulen*. In them special teachers are installed. The number of teachers in schools of this grade is, I think, about thirteen hundred men; but of this number ninety-five are specially trained and fully installed teachers of gymnastics. In the lower, primary schools, corresponding to the *Volk-Schulen*, the teaching is carried on by the teachers themselves, who, like those in Germany, have had instruction in teaching gymnastics in the normal schools.

Dr. John P. Reynolds was asked to speak.

Dr. REYNOLDS. — I ought not to speak upon this subject. I am too little familiar with its details. But my interest in every branch of it is very warm. Perhaps I may be permitted to say a word about gymnastics in Germany, as they come to the knowledge of a traveller in that country. In Germany, education of the body, no less than of the mind, is compulsory for every man-child, from the son of the sovereign to the son of the day-laborer. He must be trained in walking, in running, in leaping, and in a host of other bodily exercises. With us, the great obstacle to all this is, that we cannot bring the community, and especially teachers, to recognize the immense importance of such instruction. Teachers largely make up this assembly. Even if I appear to any of them an unfriendly critic, I deeply appreciate the attainments and the worth of the instructors of the Boston schools, and I hold their calling in the most sincere admiration.

Nearly twenty years ago, several members of the School Board, eager to advance the interests of the Latin School, attempted, among other changes,

to introduce there, in a very tentative way, the teaching of gymnastics, hoping thus to make an entering wedge for its general recognition in the public schools. A young instructor, rarely qualified, was found. It would have done your hearts good to see the spirit with which the boys took hold of the work. Those of you who have this forenoon listened to the representative of gymnastics at the Johns Hopkins, will know what a magnificent teacher the Latin School had secured. But in a year or two the Latin School gymnastics came to an end; and from that date, if we except the excellent light work of Professor Monroe, which shortly after his death ceased, bodily culture has found no place in our schools. Yet through all those years, German boys, by hundreds of thousands, have had, every one of them, unceasing care that their bodies be made supple, hardy, and strong. In that same period nearly a million children have passed through the Boston schools. Had our children no equal right to this priceless help? I will not say who robbed us of Mr. Hartwell. No interest in gymnastics existed. Nobody had leisure to take in the need of watching and strengthening the body. Instructors needed the whole time for Greek, for Latin, and for Mathematics. School hours were too crowded to admit gymnastics. Taxpayers were reported to hold such exercise an idle luxury. Not many years since the teachers of Southern Germany made just these objections. There, too, the schools could spare no time for training the bodies of the boys. But the new German Empire gave no quarter, and by its answer, "You shall," at once silenced all resistance. A despotic, tyrannical authority might secure this exercise for every Boston boy and girl. I have no belief that anything else ever will.

Travelling in Germany many years ago, I had the privilege of entering various German schools, and one day watched with interest an hour of gymnastics at Frankfort-on-the-Main. That school took especial pride in its teacher, another Hartwell in build, fresh from his normal training in Berlin. It was a rare pleasure to see him give his first lesson. A small, bare yard and a most unpretending shed, with simple apparatus, made up his resources. In the yard the older boys, of seventeen and eighteen, were soon leaping, after a short, quick run, from a spring board, over a high horse; while in the shed the younger fellows, divided into small squads, were rapidly set at work at one piece or another, — the first boy directed by the teacher, and then in his turn leading his comrades, — going over the horses, shooting the bars, trying all the feats that we so long to see grown common with us.

It has been found no light matter to bring home to those with whom the decision rests the inestimable value of training like this.

Only one other word: Some one intends shortly to exhibit, as an object-lesson, the exercise of the boys that occupy those front seats. Gymnastics in a room hot as is this seem to me unreasonable. Gymnastic exercise in air above fifty (Fahr.) degrees ought to be held a piece of barbarism.

A class exercise was then given by about twenty boys, under the direction of Emil Gröner, of the Boston German Turnverein.

The following paper was then read :—

THE PLACE OF PHYSICAL TRAINING IN A RATIONAL EDUCATION.

BY CLAES J. ENEBUSKE, PH.D.

MR. CHAIRMAN, LADIES, AND GENTLEMEN :—Inasmuch as you are certain to find it out before I have proceeded very far, I think it better to make a clean breast of it at the outset and own right up that I am not an American. For that reason I am not a master of the English language. I must ask you to bear with the eccentricities of speech to which I am a victim, and as far as possible let my good intentions offset my bad pronunciation.

As I look about me at this large gathering of distinguished people, it is a pleasure to reflect that we are assembled here in the interest of humanity. We have come from widely separated homes to mingle ideas, to express opinions, to weigh arguments, and out of the confusion to mould a system which shall make posterity our grateful debtors. We come, each of us, with conclusions founded upon careful study, but we should be willing to sacrifice them to the great common cause for which we labor, anxious only for the success of the best, eager to be convinced for the general good.

The subject of physical culture, the great question for which we are laboring to formulate an answer, is by no means a modern one. It has grown old with the world. Ages ago this same question demanded the attention of scholars. Every succeeding age has given its answer, and those answers have varied as the experience and temperament of the ages have undergone change. And now, aided by the thought and guided by the experience of the ages that have gone, it is our duty to find an answer that shall be compatible and in keeping with the advanced thought and enriched experience of our own.

The questions presented in the recent report of the Board of Supervisors on physical training in the public schools aim to embrace the essential requirements which a system of physical culture must meet. Allow me to repeat the first and most important of these questions. It is this: "Is it the purpose of the system to develop the whole body and its parts symmetrically and harmoniously; to preserve, increase, or produce bodily health, strength, and proportion; and to maintain and promote physical activity, dexterity, and efficiency?"

Let us who attempt to answer it consider well the responsibility. It is a question suggested by important and urgent reasons. It is broad and complicated, and of vast importance must the answer be.

The question as presented seems to be a compilation of three requirements, which I shall take the liberty to mention separately. It requires first that physical training should develop the parts symmetrically and in good proportion and the whole body harmoniously. These words suggest to us the conception of the classic Greeks. Beauty and harmony was the aim of the bodily exercise of their age. Secondly, it demands that training should produce bodily strength and promote physical activity, dexterity, and efficiency. These words bring us face to face with the Roman conception of the object of physical culture. Finally, we read that physical education should produce or increase bodily health. This brings us nearer to our own age, and expresses the true conception of the aim of physical education in the present century and in this country.

The combined question represents the best thought of three distinct ages and of three distinct peoples. It combines the thought and aim of ancient, literary, beauty-loving Hellas, of powerful, disciplinary, purpose-strong Rome, and of modern, intelligent, energetic America.

A system that shall answer this question, that shall meet these requirements, must be one, that shall satisfy at once the demands of three distinct ages, of three distinct classes of men, equal perhaps to each other, but in their characteristics widely different, — art-loving Hellas, war-loving Rome, and peace-loving United States. Would such a system, or rather would

such a lack of system, be wise? Would it be satisfactory? It would be a compilation of thought, an aggregate of ideas, but could there be any unity of comprehension?

In this one sentence, which aims to define the true object of physical culture in schools, there lies hidden a dualism that will prove prolific of controversy. There are in it sources of endless conflicts, conflicts over essentials and over trifles, until that formula is found which shall express the fundamental idea, about which the others shall cluster in organic union and harmony.

If we shall still further dissect this question, we shall find new difficulties arise as we proceed. We read physical culture should produce symmetry and harmony. To whom shall we turn as the authority upon symmetry and harmony? We seek the artist. We ask him to produce symmetry and harmony in our boys and girls; but his skill is with chisel and marble, not with the crude material of untrained human frames. We turn to our friend the anthropometrist. He has figures to express the proportions of the average man; but of symmetry he knows no more than ourselves, and into the domain of harmony he can go no further than his conception of art leads him. Will his rod and caliper fulfil the requirements that our purpose aims to achieve? The question demands of us bodily health, and we turn to the physician. And of whom shall we procure our conception of activity? Perhaps from the business man or the race trainer. Dexterity is demanded—we must call upon the artisan. Efficiency is sought. Let us not slight the military man, although the question makes no requirement of the important qualifications of discipline. Strength is an element demanding attention, and the athlete puts forth his claims. But who is the man, who unites in himself the capacities of the artist, the anthropometrist, the physician, the athlete, the business man, the artisan, the soldier? Who is he that comprises within his person the qualities enumerated, and these in suitable proportion?

I have suggested that the question, because of its lack of unity in the definition of physical training, will give rise to diversities. These diversities must be the cause of needless

delay in the distribution of the benefits of physical training to the pupils of the public schools. For the purpose of averting this danger and dissolving these diversities — for the purpose of unity — it is imperative that we find a definition that, while it embraces all the demands enumerated, at once regulates their mutual relation of co-ordination and subordination, and brings them in sympathy and harmony beneath the sceptre of a single governing central idea.

Who is the suitable person to whom we can submit our ideas? Who is clearly the best judge of the proper aim of physical training in schools? I will name him: The physical educator. And where shall we turn to find a suitable answer to our question? I respectfully submit to you that Sweden has given us a definition of the object of physical training in schools, which, I believe, embraces better than any other, the requirements demanded in the report of the supervisors. With your kind permission, I will repeat that definition. It is this: "The object of educational gymnastics is to train the pupil to make his body subservient to his own will."

A system of physical culture which shall make the body subservient to the will, must necessarily be one that shall produce, increase, and maintain health, strength, activity, dexterity, and efficiency. These are all conditions demanded by the will. And it must necessarily follow that, where health, strength, activity, dexterity, and efficiency are found, there symmetry and proportion will be also. Inasmuch, then, as this definition seems to meet the requirements which experience and necessity demand, I suggest that the idea of Sweden be adopted as expressing the best conception of the object of physical training. About this idea the thoughts of ancient Greece, of Rome, and of modern America group themselves in perfect sympathy and harmony.

But this idea must not be understood as identical with and must not be confounded with the idea of the mediæval age. This also contemplated the necessity of bringing the body under the subjection of the will. But it was not a lawful subjection; it was the tyranny of mind over the body, — the mind a despot, the body a serf.

The Swedish definition implies the modern conception of a harmonious relation of body to mind. It means the complete but the joyful submission of the functions and activities of the body to the dictates of the will. Such a harmonious submission of the body to the will is but another expression for health, though it is broader in its scope, more comprehensive, and above all it is *the most suggestive to the physical educator*. It will prevent his placing strength as the paramount aim of the physical training. At every turn the question confronts him: Is there a distinct, unchangeable, necessary relation between strength and health, between strength and the body's harmony with will? It must teach the educator that the true aim is to clothe the healthy frame with honest muscles which shall act as faithful and efficient servants of the will. This is the true province of the system of physical training for our schools.

As far as the problem of health enters into the object of physical training, the educator must make his work the training of scholars, not the treatment of patients. The average boy and girl are not patients nor invalids, albeit they are the children of a nervous age. The demand for proportion and harmony of the body must be subjected to the same reasonable test, and, while he fully recognizes the importance of keeping his pupils within the limits of proportion, that gives evidence of health, yet he will not attempt to change nature's own plan of physical individuality. He will not deem it his aim to find in mankind a distinct, never-varying relation between bodily proportion and health. He will not be ruled by the prejudice that the individual is worthier as he more nearly approaches the *scheduled proportions of the average man*. He will demand the proof, as yet unprovided, that the individual who conforms to the geometric symbol of the anthropometrist must necessarily be a worthier type of mankind. Until he receives this proof, he will be satisfied with that symmetry and proportion which nature displays in the individual frame, when the conditions of health—that is to say, the harmony of the body and the will—are carefully guarded and promoted.

The faithful educator who understands fully the needs and the aim of physical training will never allow the demands for

physical activity, dexterity, and efficiency to lead him into a corruption of his office to unworthy ends. He will not consider it within the province of his training to endow the pupils with the swiftness of the horse or the suppleness of the serpent. The bodily skill which he shall strive to produce will be a general and not a special one. Even the demand of the soldier to have that skill requisite for his calling developed in the school must be made subservient to the general purpose of physical training in the schools.

But the question will be asked, Shall physical training be limited to this relation of body and will? Must not the true system be one that shall stimulate the intellect, that shall arouse the moral qualities of courage, self-reliance, etc.? I reply that a true system of physical training must and does. But we must not lose sight of the necessity of a prudent distribution of labor even in educational work. *Physical education* is not synonymous with *education*. It is but *one* of the many departments of the whole province of education. *Education* has for its aim the highest development of the best possibilities of the individual. But the aim can be obtained only through the harmonious workings of the different departments. The *spiritual and moral education* shall bring the human will into harmony with the religious and moral purposes of man. The *intellectual education* shall bring the will under the leadership of the enlightened intellect. The *physical education*, while partaking in a measure of the essence of the other departments, shall aim especially to bring the body into harmony with the will.

The physical educator must not stand isolated. He must take his position upon the same plane and by the side of the minister and the secular teacher. When this is done, when they begin to labor in sympathy and harmony, then, and not till then, we shall begin to see the features of the ideal man.

Ling's pedagogical gymnastics is a system of physical training the practical application of which is in accord with the views upon the object of physical training which I have advanced. While it develops health, strength, proportion, and efficiency by means of bodily positions and movements, based upon the laws and needs of human organism, the central idea of devel-

oping and increasing the will's control of and command over the body is expressed in every movement, in every day's lesson and throughout the whole course of lessons, by which the training is carried out.

Without going into a detailed description of this system, I would say that I should deem it an especial favor to be allowed to make answer in plain sentences to the charges which I anticipate will be brought against it. Thanking you for your very kind indulgence, I will for a time make room for abler and more pleasurable speakers.

Second Session.

FRIDAY, DECEMBER 2.

The conference was called to order at 3 P.M. by Dr. Harris. The following paper was read:—

THE CHIEF CHARACTERISTICS OF THE SWEDISH SYSTEM OF GYMNASTICS.

BY NILS POSSE, M.G.

IF a chemist were called upon to explain in a few words the general contents of his science and how it differs from other sciences, he would probably refrain from trying such an experiment; for his dilemma would be the same as mine to-day; he would hardly know where to begin or how to select from such an abundance of material. The fact is, that to understand fully the Swedish system of gymnastics, or any other that has any righteous claim to the prefix "system," it is necessary to be thoroughly conversant with the principles that are fundamental to all gymnastics; it is a knowledge not to be gained in a few minutes, nor to be explained in a few words. Yet I will attempt to state briefly in what respects the Swedish method differs from the others.

The Swedish system of gymnastics, devised by P. H. Ling in the beginning of this century, was already at its birth founded upon the laws of nature and upon the laws of the human organism. Since the days of Ling the system has been much perfected and improved by Ling's followers, who have made it keep even pace with the progress in those sciences upon which it is based. For that reason the system is not altogether as antiquated as some of its antagonists would fain have the uninitiated think; and the fact that it has survived in a country

where nothing is done in a superficial and irrational way ought to be a guarantee for its efficiency.

First let us consider how the exercises are selected.

The exercises are chosen according to their *gymnastic value*, which quality depends on how the movement combines the utmost effect on the body with simplicity and beauty of performance. Only such exercises are used whose local and general effects are fairly well known and proved to be needed by the body. Not only the needs of the individual, but his abilities as well are to be taken into consideration; and for that reason the teacher must know how to vary the exercises according to the degree of physical culture possessed by the pupil. The movement should have its developing effects in a short time; it should be simple so that every pupil can do it fairly well; and it should have beauty of execution according to each one's ability.

In order to supply the needs of the organism and to develop the body harmoniously, the exercises have to overcome a great many tendencies to faulty growth or bad posture; and the *greater or less value* of a movement depends on its power to counteract or correct these tendencies. It naturally follows that the system uses no exercises which would encourage such faults (for instance, using chest-weights for beginners, etc.). If an exercise gives rise to faulty posture, it is discarded, or at least postponed till some future day when it can be correctly executed.

In accordance with the physiological truth that the first, greatest, and most extensive effect of exercise is on the respiratory organs, and that hence, during exercise, these organs must be allowed perfect freedom of motion, the Swedish method disapproves of and discards all movements which compress the chest (such as Indian club swinging), or which in any way interfere with free respiration; and the greatest attention is given to the proper development of the chest. In recognition of the fact that, to be truly strong, a man must know how to breathe well, much prominence has been given to "respiratory" exercises. "Breathe!" "Don't hold your breath!" are common exhortations in gymnasiums where this method is used.

In judging of the effects of an exercise, we think the least of the muscular development produced; for, the effect of *all* gen-

eral exercise is to develop muscle, and this aim is reached without especially working for it. But we think all the more of the effects produced on nerves, vessels, etc., for the results in this direction can be vastly changed by varying the movements (as demonstrated in Medical Gymnastics) ; in other words, the exercises have been made to harmonize with the laws of physiology. How this is done will be understood from the description of the exercises which are contained in each lesson (to which I shall soon refer).

Measuring a man's strength, we compare the man to himself ; we do not say that a man is strong because he can hold so much air, or because he can lift so many pounds, or because he can jump so high. But when he possesses a healthy, well-balanced, and well-proportioned body, which his will has under good control, then he possesses physical culture, even though in the eyes of some he may seem weak as compared to others. It is this health, symmetry, and harmony we aim at in selecting the exercises ; and that the Swedish method accomplishes its purpose has been too well demonstrated to leave room for doubt.

Movements are never chosen "because they look so pretty" ; for educational gymnastics do not aim at beauty of performance. When gymnastics do have such an aim they are called "æsthetical," and these have but little effect toward physical development. And yet we claim that when a movement is well done it is graceful as well. Some persons mistake a languid manner of motion for grace, and hence claim that the Swedish exercises "are too jerky to be graceful." It is to be remembered that all gymnastic movements are not slow, nor do they have an even velocity ; there are some that can and always should be done with great and accelerating speed, and you can move quickly and yet do it gracefully. By making the component motions of movements like the arm-extensions merge into each other in a "graceful" manner, the effect of the movements is completely lost. On the other hand, if exercises like leg-elevations, backward-flexions of the trunk, etc., are done in a "jerky" manner, these movements are incorrectly executed and have lost their best effects.

Our second point for consideration is the regularity of method.

In order that gymnastics be systematic there must be progression. In the Swedish method this is adhered to very strictly, so that the exercises, beginning by the very simplest, gradually become stronger and more complicated. So closely has the effect of movements on the human organism been studied, that the slightest change of position — even the turning of a hand — has its recognized influence in the progression; and it is here that the system demands the most from the teacher: without a good knowledge in this direction he becomes worse than useless. No movement is attempted unless the previous ones of *the same kind* have been thoroughly practised; and no exercise is used whose commencing position has not already been practised sufficiently to guarantee its correctness; for, if the commencing position is faulty, the movement cannot be rightly executed.

The Swedish method does not disapprove of chest-weights, dumb-bells, and allied forms of apparatus; but through *years* of constant practice it leads up to them, claiming that before increasing the weight by external means, you should make a progression by prolonging the lever of the weight already present. So, for instance, a backward-flexion of the trunk with the arms extended upward and the hands holding weights must necessarily be preceded by the same movement without the weights, and that by a flexion with the hands fixed behind the neck, and still earlier with the hands on the hips, etc.

In a like manner the method prepares the way for æsthetical gymnastics, for fencing, military drill, and other forms of applied gymnastics, yet insisting that educational gymnastics form the basis of all these. This is reasonable; for, unless you have learned to control the involuntary co-ordination of motion, which is the cause of "faults" in gymnastics, you will hardly be able to produce the great voluntary co-ordination required in all forms of advanced gymnastics.

Now, when you are to put this progression into practice, you will not feel as if groping in the dark; for, in this method, the movements have been thoroughly systematized and included under distinctive headings, where there is no more a jumble, but where the rules of progression can be well carried through

by a teacher familiar with the theory of gymnastics. After years of practical investigation it was found that if, in every lesson, the exercises followed each other in a certain, comparatively unchanging order, the movements could be made stronger; they could be given more duration; ill results could be completely prevented; and hence the good effects became all the more pronounced. For that reason all movements were divided into classes, and this order was made the basis for the classification. All the exercises can be included under the various headings; and within each class — with infinite variety — the exercises grow gradually stronger as the pupils develop.

This classification will be found not only to contain exercises filling the needs of the organism, but to correspond to physiological principles as well. To understand this we shall have to consider it a little in detail.

(1) *Introductions*. By these we understand some simple exercises used at the beginning of a lesson to gain a little general muscular control, to correct the base and general position, etc.

(2) *Arch-flexions*, which consist of backward-flexions of the trunk; they have the effect of straightening the dorsal region of the spine; of vaulting the chest forward by drawing the lower ribs apart, thus increasing the chest-capacity; and of cultivating the extensibility of the upper region of the abdomen.

(3) *Heaving-movements*, which consist of various exercises in a hanging position, and others that have the effect of expanding the upper part of the chest by lifting it upward; incidentally they also develop the arms. If these movements are not preceded by the arch-flexions they will produce lameness in the upper region of the abdomen. Free-standing arm-extensions are classified in this group, since their effects resemble those of heaving-movements, for which they also prepare the way.

(4) *Balance-movements*. The two preceding exercises are strong, hence they increase the heart-beat noticeably. Now a rest ought to ensue, — the word *rest* not to be understood as meaning inactivity, but changed activity, — and the time is conveniently filled by the gentle movements which we call balance-movements. These require but little effort from any one of the many muscles brought into play; the heart-beat is not increased

by them, but it becomes lessened by the mechanical propulsion of the blood into the legs (the more equal distribution of the blood-pressure). At the end of a balance-movement the pupil is again ready for more specific work.

(5) *Shoulder-blade-movements* consist of arm-movements which have the effect of placing the shoulder-blades in correct position. These exercises are in a measure dependent on arch-flexions and heaving-movements; for, unless the dorsal region of the spine is straightened and the upper region of the chest is extensible, but little can be done toward overcoming a "stoop."

(6) *Abdominal exercises* bring into forcible play the abdominal walls; their effects are to incite peristalsis, to promote digestion and to shorten the stay of the food in the intestinal canal.

(7) *Lateral trunk-movements* consist of rotations and sideways-flexions, etc., of the trunk. They have a far-reaching effect on the general circulation by accelerating the flow in the inferior vena cava, leading the blood off from the abdomen and legs, etc. Incidentally they also expand the chest laterally and strengthen the muscles around the waist.

(8) *Slow leg-movements*. By this time the heart-beat is again much increased; the slow leg-movements furnish a means of lessening it. For, by these the blood becomes mechanically propelled forward, through the forcible, passive extension of some muscles, while others are in gentle, active contraction. These movements may be conveniently omitted, when the previous exercises are not strong enough to make them a necessity.

(9) *Jumping and vaulting*. These exercises have the effect of cultivating the general elasticity of the body more than does any other form of movement. And if we recall that grace and elasticity are very nearly identical in gymnastics, we understand the gymnastic need of these movements. But they also have practical value; for we are often called upon to jump; and if it so happens, it is well to know how. They develop courage, self-reliance, a true appreciation of space, and produce great ability of voluntary co-ordination of motion as well. The Swedish method differs from all others (not founded on it) in its manner of preparing the jumping by practising the inter-

mediate positions, before the real movement is attempted, as well as in demanding that correct "landing" should be insisted upon. In like manner the vaulting is prepared by first cultivating in the pupil the habit of clinging to the bar, no matter what happens, before he is made to leap over it. And the progression is so strict, that we have no accidents to record in these "violent" or precipitate movements.

(10) *Respiratory exercises.* These consist of deep inhalation and exhalation accompanied by some arm-movement that will expand and contract the chest in even rhythm with the respiratory act. The movements, which can be conveniently combined with some movements of the legs or trunk, have the effect of restoring free respiration (the jumping putting the pupil out of breath) and to lessen the heart-beat. Respiratory exercises are brought in not only at the end of every lesson, but at any time when their effects are needed, and often also at the beginning of a lesson containing strong exercises that require an increased amount of oxygen.

To this daily curriculum various additions are often made, such as to bring in one more shoulder-blade-movement, when needed; or another heaving-movement; or an abdominal exercise; or to leave the last one entirely out for children, and so on—as the teacher may decide.

In addition to the free-standing movements, each class contains numberless exercises on apparatus, and supplies a sufficient number to form a progression from early infancy to well-developed manhood—through all the grades in school and college, and in after-life as well.

The third point in which the Swedish system differs from the majority of others is in the method of applying the exercises.

The movements are applied to words of command, this being the only method enabling the pupil to concentrate his mind on one thing at a time, that thing being his own movement. This is in accordance with the definition of gymnastic movement, which tells us that, unless a movement is done with full volition, it ceases to be gymnastic. In those methods which use imitation, memorizing, etc., the movements become mechanical, the pupil dividing his attention between himself and something

outside him, *i.e.* they cease to be gymnastic. Objections have been raised to using words of command, because "it is too tiresome," "too soldier-like," etc. To this we can answer, that to get the full recreation and rest out of exercise we should put our whole mind into it, this being much less tiresome than to exercise while we think of something else. On the one hand we have the theory of a small minority of antagonists, that gymnastics without music do not give enough recreation, especially to children, because there is not enough exhilaration in such exercises; on the other hand we have the statement of a large majority of children and others who have tried gymnastics to music as well as to words of command, the children saying that there is "much more fun" in the latter, and the adults that there is "much more to them." As for the second objection, we claim that discipline is necessary not only for a soldier but for everybody, if we are to have any control whatsoever over ourselves; and hence discipline should form a part of everybody's education. Words of command have other advantages. They teach the pupil to think quickly; to act as quickly and to do a thing in the shortest possible time. This is no little gain in the present age of hurry and competition. Besides, the use of commands enables the teacher always to keep his class "in hand"; it becomes easier for him not only to teach, but to correct as well.

The Swedish method disapproves utterly of the use of music, for the very simple reason that but few gymnastic movements are rhythmical, and cannot be made to be so without sacrificing the movement. On the other hand, every gymnastic movement has a rhythm of its own, which, however, distinctly differs from the rhythm of music. If music were to be used, its rhythm would have to change at every motion, and I doubt if any player, even a Rubinstein, would be able to make it do so. Take, for instance, such a movement as "preparation to jumping" (consisting of 1. Heel-elevation. 2. Knee-flexion. 3. Knee-extension. 4. Lowering of the heels); the first motion is exceedingly quick; the second moderately quick; the third comparatively slow; and the fourth still slower. Now, where is the music to fit such a movement?

A recent lecturer on gymnastics made the somewhat startling statement that "the arm-movements are not gymnastics (for example : arms extended sideways, in front, above the head, etc.)." If that teacher had said "arm-movements done to music are not gymnastics," the statement would have been correct. For let us investigate these arm-extensions. Starting with arms hanging down, they consist of flexion upward of the forearm, a movement occurring slowly from beginning to end,—if it is to be done correctly,—and extension in any direction, which movement, once started, occurs with great and accelerating speed. Now, if this is done to music, the flexion takes place so quickly that the forearm rebounds and gives the intermediate position of semi-flexion instead of complete flexion. In consequence thereof the extensors are not in the state of complete relaxation which should exist before they are made to contract, and their contraction will not be as forcible nor as quick as it ought to be. Besides, the music will give it the same speed as it gives to the flexion, which is entirely wrong. In most flexions a great many comparatively strong muscles perform the motion, hence these movements must occur slowly; whereas the extensions are executed by few and comparatively weaker muscles, hence they can and should occur more quickly than the flexions. This is especially evident in the arm-extensions just mentioned, and when they are done to music, their gymnastic form always has to be sacrificed, *i.e.* they cease to be gymnastics. In a like manner we could investigate all other gymnastic movements and with the same result in all except a few oscillatory movements, like walking, running, etc.

Besides, when exercising to music, the pupil will be found to pay more attention to the rhythm of the music than to the form of the movement (if we presume that the latter could be made rhythmical), and we get the same result as in all cases where work is done with divided attention—one of the things has to be sacrificed for the other.

From the above it will be seen that the system is *rational*, since it seeks a reason for everything that it uses or adopts: it makes theory and practice harmonize. But it is *practical* as

well; for it does not rely on elaborate apparatus for existence, since the exercises, not the apparatus, constitute the system. The movements can be taken anywhere where there is sufficient floor-space to stand on and sufficient oxygen in the air. On the other hand, though the system prefers its own apparatus, the exercises can be most easily adapted to apparatus belonging to other systems, or to such simple means as ordinary chairs and desks, or other furniture. Though apparatus is desirable, it is not absolutely necessary for good physical development, especially in gymnastics for children.

Whatever its deficiencies, the system has not only survived on its own merits, in spite of the close scrutiny to which it has been subjected by gymnastically learned men all over the world, but it has finally been adopted in every country where its principles have been thoroughly tested, even conservative England having at last yielded.

Before closing, I take occasion to warn you against confounding Swedish Educational Gymnastics with Medical Gymnastics, commonly known as "Swedish Movement Cure"; although based on the same principles, the two are entirely different, not only as to their purposes, but in the exercises used as well.

An exhibition of the Swedish system of gymnastics was then given by a class of ladies under the care of Mr. Posse. .

DISCUSSION.

Dr. Harris invited the Earl of Meath to open the discussion.

THE EARL OF MEATH. — Mr. President, Ladies, and Gentlemen, — I was utterly unprepared to be called upon at this early hour; I had hoped first to hear a little of the discussion. It is certainly true that I have been interested in this question of physical education, but I am afraid that I cannot lay claim to any great knowledge on the subject. It is also true, as you have been told, that "conservative England" has, to a certain extent, adopted the Swedish system. That is to say, the Swedish system has been quite recently introduced into the board schools of London, and I and others are endeavoring to induce the Government and local authorities to spread this system through the board schools of the whole land; however, we have not yet succeeded. The reason that we in England believe this Swedish system to be the one best adapted to our schools, is, I am afraid, one which the eminent lecturer

would not think a very good one. I believe it is simply because we find it the most economical. I need not tell you that taxpayers do not like to be taxed; and if you can show them that you can help them without compelling them to put their hands in their pockets to pay for it, they will listen. We who are anxious to have physical education carried out have rather jumped at this Swedish system because they told us that no apparatus was necessary, and I believe that a good many support it for that reason. But I believe there is a great deal more to be said in its favor than that it is economical. Those who have tried it are persuaded that it has the most scientific principles behind it upon which one can teach physical exercises; that whereas the ordinary system only exercises certain muscles, this system exercises all, and in such a way that it shall not be hurtful to the muscles or injurious to the health of the pupils. An illustration of the success of the Ling system was seen this year in London, when a Swedish gentleman, anxious to show what his country could do, brought together some forty Swedish gentlemen, picked indiscriminately from those he met at the Paris Exhibition, and invited them to London to show what they could do in Sweden. These gentlemen, of all professions, came together, and after exercising simply four times, gave an athletic exhibition which I do not think could have been equalled except by professional acrobats in our country.

I believe that in this country, as well as in the one I come from, physical exercises are much needed. In England our towns are rapidly increasing. Here also you have large centres of population, and in these centres there are few means for the poorer classes to train their children in healthy exercise. In New York I have been struck by the want of open spaces where children can exercise their limbs. I believe that if these civilized nations that are congregated into large centres do not take some means to exercise the young, that we shall find physical deterioration taking place. I am perfectly certain that that is the case in the large towns of England, and I feel pretty sure, after passing through some of the more crowded parts of New York, that this physical training is just as much needed here. It is therefore with the greatest pleasure that I welcome the advent of Swedish gentlemen here who are able to demonstrate to you what a successful system the Swedish system is, and I only hope that we shall see this system introduced into all of our national schools and into all of our public schools.

Dr. JAY W. SEAVER of Yale University. — This is a day when Yale men are not in public. Princeton put us in the hole yesterday, and I do not know when we shall be able to come out! But I know that Yale men agree with me in feeling great interest in this matter of physical education; and so I am heart and soul with you, ladies and gentlemen of Boston, in your meetings here to-day and to-morrow, where you are trying to arrive at some conclusion as to what shall be the best system of physical training to introduce into your public schools. You seem to have reached the point that you see there is a need for something, and that is half of the battle.

I do not know enough about this Swedish system to say that that is the one

which will satisfy every need. I do not believe that it is. I might say exactly the same of the German system, and I might say that we have not yet in America developed a system that will be perfectly satisfactory, but I do believe that you are right when you try to start on some systematic method. As far as my knowledge goes, there has never been a system developed with so much scientific study and painstaking as this Ling system. But our American needs are peculiar. If we had an open lot in every square in our large cities, and pleasant weather through the twelve months of the year, I do not think that we should need many gymnasiums. I am an advocate of out-door work. So far I am "English, you know!" I advise every man to work out doors so long as he can, even until the weather is inclement. But I recognize that we must have something else. Now, then, if this Swedish system is the one that can best be adapted to your Boston circumstances and surroundings, if you can make the environment modify that system so that it shall become Americanized, I believe you will have the most perfect system that has ever been developed. I believe in it because you have a peculiar condition in your public schools. You have children who are over-trained mentally and under-trained physically. We are producing a set of dudes, and not of robust, hardy young men and women. We want to turn right about face, and get more bone and muscle, more blood in our necks, and then we shall accomplish more. If we do this we shall not retrograde. The Ling system will train and develop the bodies of our boys and girls.

But I believe that if we adopt this system we must modify it. Whatever system we take, it must be adapted to the circumstances in a scientific way, so that we may get results that shall mean something. If we make mistakes we can again change and modify. That is the peculiar genius of America. We are not afraid to try something new, to launch out into seas before unknown to us. If we make mistakes we easily repair them. The system for your schools must be something entirely different from that of our colleges. The work that Dr. Hitchcock is doing at Amherst, Dr. Sargent is doing at Harvard, and Dr. Hartwell is doing at Baltimore, is very different from what is demanded in the primary, grammar, and high schools. The conditions are different. They work for men who have reached years of intelligence, who are old enough to have judgment and regard for their own physical welfare. If a course of work is marked out for them, they will follow it. But you cannot do this with children. They do not know what is best for themselves and they do not care, and as we are crowding them five hours in the day and five days in the week with mental work, we must provide something for their physical welfare. We must build them up physically and give an outlet to the nervous energy which is driving them on day after day, and making old men and women of them before they are out of their teens.

What will the Swedish system do? I believe one criticism can be made that is fair and honest, — that it requires too much mental attention. The pupil must have his attention centred on the instructor all the time. The pupil has all the time to watch for the word of command. Here in America

(it may be wrong, but it is true) we do not care a snap for any man's say so. We do not like to be ordered around to do anything. It always made me mad, as a boy, and it does still, to have any one talk to me in a dictatorial way. I believe it is contrary to the American spirit and custom. Is this an insuperable objection to the Swedish system? I think not. I believe that some of these gentlemen who are so successful as teachers will see the needs of America, and will modify that certainly objectionable phase. It is for you Yankee schoolma'ams to help out in this, and I am glad to see you are interested in this work, for I am told that it is mostly school teachers who have illustrated this system in class work here to-day. You know the needs of Yankee boys and girls, as well as of Irish and German. If you understand this Swedish system, you will see chances for improving it. It is not a system that was established one hundred years ago in all its perfection, born, like a certain mythological creature, full-armed and ripe. It has been the development of generations. Add the developments of another generation to it, and see if it will not be a little more perfect flower than it is to-day. I believe that if there is one thing where we Yankees surpass other people, it is in our inventive ingenuity. We are always criticising, and seeing some fault that we can remedy in other people's work. Can we not take this system and remodel it, and make it just what we want?

I am, further, a great believer in the good effect of the personality of a teacher. I do not believe you will ever, by hunting around, find a system that will be successful in the hands of every teacher. I believe Dr. Sargent must pursue one method, Dr. Anderson another; Dr. Hitchcock will follow another, and that Dr. Hartwell will take still another. The foundation principle being the same, the method of execution may differ. We cannot follow in the same method, or run in the same rut; but if there be any system devised which shall introduce individual enthusiasm into this work, we shall have success.

Dr. W. G. ANDERSON of the Brooklyn School for Physical Training. — I am an American. It is natural, therefore, that I should defend anything that is American if it is worthy of defence. Mr. Posse has given several exercises illustrating the methods adopted by our teachers. I have never seen a good teacher give such grotesque movements. They are not fair selections from our work.

The so-called American system is as scientific as that of Ling. Why should it not be? We begin where he stopped; we have his experience. I have much respect for the German and Swedish systems; I have had experience in both: but, taken as they are, they will not suit the American people. We have ideas of our own; and it is not often that methods of other countries will suit us, unless they are modified. I believe in music. My experience has shown me that as good results can be obtained from many exercises if accompanied by appropriate music. If two classes take the same movements, one class working to an accompaniment played by an expert (for it requires an expert to play for gymnastics), the other class drilled by counting

or thumping on the floor with a stick, how can you prove that music has been detrimental in one case, while the counting was beneficial in the other? Did the fife and drum have any effect on tired soldiers during the war? I have not found that the exhilaration caused by music in gymnastics has interfered with the muscular or nervous training of children. We do not, of course, do everything to music, but many of the lighter exercises can be thus executed; and I have yet to hear an argument that will convince me that such gymnastic training suffers by music. This work is to go on in the schools. I hardly think it will be a success if pupils are obliged to exercise in the space between the desks, while the regular teacher leads them.

In the first place, we do not associate physical culture with a small space. Room is required. The aisles will of necessity limit the number of exercises, while, in the second place, I do not believe the regular teacher can or will spare the time to learn the science of physical training, that she may teach gymnastics to her pupils.

Unless I am greatly mistaken, our teachers have all they can do. Their time is spoken and paid for. Extra work will involve additional expense. I admit that a few enthusiastic teachers will start the work in their schools, but I doubt if they keep it up. It is not for a week or month: it is for years, day after day. I would suggest that the basements be cleared out, well heated, lighted, and ventilated, equipped with appliances for light gymnastics, a special teacher engaged, and the pupils sent to her from fifteen to thirty minutes a day.

The instructor of gymnastics, being a specialist, can do better work than the regular teacher, who would be compelled to learn two professions if she were to supervise the work and teach it as it should be taught. I believe that the system adopted by the Boston Public Schools must be an eclectic one. It must embrace the best ideas of all known methods. The unmodified Swedish and German systems are not so attractive to Americans as the same arrangements changed to suit our likes and dislikes. The system itself will not produce the results, but the way the system is taught. I believe that perfection exists only in the mind. If our system is perfect, we can only approach this high standard by the best-known methods of imparting knowledge. All the country will watch the Boston schools if they adopt physical training as a part of their regular curriculum, because of their reputation in mental work. If these schools are going to give but a few minutes each day to gymnastics, and the work be confined to the aisles, we shall not have grand results. If a mental branch requires one hour a day, then why not give the same time to corporal education?

I have spoken rather positively on this subject, because I have some right to. For six years I have given all of my time as a physician to the physical training of school teachers and children. In the Adelphi Academy, where I teach, there are nearly one thousand pupils of both sexes, the majority of whom take exercise daily (obligatory). This has given me an opportunity to make observations that no other American physician has had; in fact, I

do not know of another doctor of medicine in this country who can make the same statement. If the Allen system is the best, I should recommend its adoption. If the Ling or German systems will answer, then take them. I do not believe we are in a position just now to say which is the best. If the Boston masters will try the Ling system for one year, then we shall have men who can better judge of its merits; but at the same time a similar test should be given to the so-called American system. One word about my own methods. Most of the gymnastic motions I have classified into an alphabet of sixteen movements, each having its own name and special purpose. The combinations made by this arrangement are countless. The various physical defects in children caused by lack of proper exercise have been tabulated, and the movements of the alphabet adapted to them. There is a cause, reason for, and remedy for such defects, which include certain mental weaknesses, and we try to make the children understand the "whys and wherefores" of this work. Progression is a part of our methods. Variety is essential. We try to make the work pleasing. We borrow and modify, if necessary, ideas from other systems. We believe that this training is beneficial to both mind and body.

The President then introduced Dr. Edward Hitchcock of Amherst as one of the pioneers in physical education in this country. Dr. Hitchcock read a paper on "Some Principles regarded as Essential in the Direction of the Department of Physical Education and Hygiene," prefacing it with the following remarks:—

DR. HITCHCOCK. — I do not know what to say about children, except that we have had ten of them at our house; but as to children in the public schools I do not know anything about them. If I can help you any by telling you what we have been doing at Amherst College in physical education, I shall be glad to do it. Let me say first that I am grateful for the compliments that these young and bright men have given to me.

The gentlemen have spoken of American methods. I have been working at physical culture for quarter of a century, expecting every year that Amherst College would want to try another man, but I am still there. I do not, however, think that we have a system. We have got a branch of the service, as artillery, infantry, and the various bureaus are branches of the military service. But I do not think that we have a system that can be incorporated in the schools yet. I must take a strong stand on that. We have not a universal system that will govern us. But I am rejoiced that the Boston people are discussing the question of the Ling system. I rejoice that they are ready and willing to bring up something different from what we have been at work at, and by and by we shall get something worthy out of it. We are always experimenting; indeed we are an experiment as a nation.

SOME PRINCIPLES REGARDED AS ESSENTIAL IN THE DIRECTION OF THE DEPARTMENT OF PHYSICAL EDUCATION AND HYGIENE.

“There really does not exist a system of physical education which is both natural and essential, and which can be, and has been, beneficially incorporated into existing educational methods.” — DR. G. D. STAHLEY, in “*The Doctor*” for November, 1889.

BY DR. EDWARD HITCHCOCK.

PHYSICAL education, as the term is understood in Amherst College, is such a cultivation of the powers and capabilities of the student as will enable him to maintain his bodily conditions in the best working order, while providing at the same time for the greatest efficiency of his intellectual and spiritual life. To promote this end, official direction should so control the student that he cannot seriously neglect his physical, with which are so closely interdependent his intellectual and moral interests. He must not be permitted to cultivate any other part of his nature at the expense of the physical, nor, on the other hand, any part of the physical at the expense of any other part.

Every student, immediately on entering college, is subjected to a thorough and searching anthropometric examination, and furnished with a systematic statement of his physical condition. To each are then given, by public lecture and private interview, certain theoretical and practical principles by which he may care intelligently for his own health. As early as possible in the course he receives instruction in human anatomy and physiology, illustrated by actual preparations of the human body and by *papier maché* models.

Every student of average health of body and condition of limbs is required to take, under the eye of a professor, teacher, or director, as often as four days in each week, a certain minimum amount of muscular exercise, of such nature as is adapted to a class of young men working together. The exertion de-

manded by this exercise is not violent, but only such as is rhythmic, steady, and adapted to secure free movements of the body and limbs. The results sought therein are elasticity, vigor, and suppleness, rather than great or prolonged muscular power.

Besides its provision for the simple and somewhat methodical movements required of the students by classes, the gymnasium is furnished with abundant fixed apparatus for bilateral use, and for the symmetrical development of all parts of the body ; which apparatus is intended for voluntary use by the students. Also to a few men in the college a limited supply of heavy apparatus is accessible, though always to be used under more or less supervision from the director or trainer. With this special apparatus the director is able to prescribe exercises adapted to any individual whose bodily development is unequal or imperfect.

In addition to the above-mentioned uses, the gymnasium is regarded as the place where play and amusement not of a required, systematic or prescribed character may be had and encouraged.

Athletic sports and contests are to be encouraged within limits. The physical examinations will reveal a few who ought under no consideration to enter a race, match game, or contest for a prize or record. For the great mass of the students, however, training in out-door sports is considered most desirable.

Every one is recommended also to be out of doors, in wind, storm, or sunshine, engaged in some active exercise such as walking, running, or riding, for at least one good hour each day. This is a supplement to the gymnasium, not a substitute for it : a well-lighted, well-heated, bath-furnished gymnasium, readily accessible the year round, is a *sine qua non* for the education of college students, whatever else they may have in the way of physical training.

Experience has demonstrated the need of having in charge of the department two medical men, who may be freely consulted on all matters of public and personal health, and in all ordinary accidents and disorders, though with no compulsion to the student as to treatment strictly medical. These physicians are expected, in term time, to know the physical condition of every student ; a duty easily fulfilled, as they meet the

student at his daily required exercise at the gymnasium, where any physical weakness will certainly manifest itself.

A competitive class exhibition has proved itself an essential requisite for keeping up a high standard of class work. Amherst College believes, moreover, that the department of physical education and hygiene should stand on a footing of recognized equality with the other departments of the curriculum.

That is the result of what we have been doing at Amherst for twenty-eight years. It is not a standard for Boston, or any one else. I do not suppose Dr. Sargent, Dr. Seaver, or Dr. Anderson would adopt it. It is greatly dependent on the personality of the man. The personality of the man must guide his class. A teacher of Greek, mathematics, or literature may be an excellent teacher of these branches, and not necessarily be able to teach physical education well. Until we are able to get good teachers, and are willing to pay them well, I am afraid we shall continue in this experimental age.

A dumb-bell exercise followed, under the charge of Mr. H. L. Chadwick, of the Young Men's Christian Association, who contended that America had a system of her own, and that he would demonstrate that fact by the exercises of the class of boys before the audience.

The discussion was then resumed, and Dr. Harris called first on Dr. Alice T. Hall of the Women's College, Baltimore.

Dr. HALL.—The Women's College of Baltimore was the first to place the department of physical education on the same plane as the other departments, requiring an hour a day through the four years before a degree will be granted. When I began to study this question of physical training, I took a few weeks' course of Dr. Sargent. I did not ask for a certificate, for I knew that after five weeks' study I did not know enough to teach gymnastics. But I got an idea of what a teacher should be. Then I went to see the systems in other countries. I went first to Germany. There I saw the girls exercise in unhygienic clothing and in an unhygienic room and in an uninterested manner. Still, I thought they did very well. Then I went to Sweden, and the first thing that impressed me was the magnificent carriage of the men, women, and children. They walked without music; they held themselves erect; their heads were well poised; their step was firm; they had, in a word, perfect control of themselves, to an extent that I had never seen in any

other country. I went to the schools. I saw the children exercising at their desks, with little apparatus. Their attention was something remarkable. Every eye was in the right place; they were not looking at their neighbors; their motions were perfect, and they were as interested as they possibly could be. Then and there I decided that the Swedish system was the one that could be used to the greatest advantage in America, until we had taken what was best in all, and made a system of our own. That is what I believe we are coming to. When our gymnastic classes were formed in Baltimore, they were put under the care of a Swedish lady who had graduated from the Royal Central Institute at Stockholm. I noticed that the girls who entered were like ordinary American college girls. They carried themselves in the American style. They were free and easy, but their movements were not altogether good. In a month's time the improvement was something wonderful. Their walk on the street and their carriage in general is remarkably improved, and they have had as yet but twelve lessons. We Americans have a great liking for apparatus. We can do anything; but we must have appliances to do with. We like to have people see that we can do things well. But I should say that if we have to consider economy in connection with this question, let us economize in the apparatus. Let us provide as simple apparatus as may be, and give the money to the teachers for teaching gymnastics. We shall get better teachers if we pay better salaries. The exhibitions which have been given demonstrate pretty fairly the different systems. In the last, the so-called American, we have seen a great deal of energy expended, and many movements that would have been well done had more attention been given to position. In the German system, we have seen the effect of not training the attention, and I think this is one of the most important things to be trained. If a child's attention is trained, and its powers of observation are well developed, that child will do better work in his other studies. That is one of the reasons why I favor the Swedish system, for it gives those results.

Dr. HELEN PUTNAM of Vassar College. — All colleges for women will be glad to see the public schools adopt some good system of physical training. I have been interested in ascertaining from the students at Vassar the amount of physical education which they had previous to coming to college, and have recorded these data, to guide us in adapting our work to their abilities, and to inform myself as to the work of schools in this direction. The number of young women who come to college having had no educational physical exercise is something that has surprised me. The percentage of seven hundred students receiving some such training is twenty-nine; but as nine per cent had their training in private gymnasiums, only twenty per cent reported school work. Of this twenty per cent not more than one per cent had work which was sufficiently well conducted to require a gymnastic suit. The others exercised in ordinary dress. In the year 1883-4 the percentage was twenty-nine, the same as the percentage of the whole; in 1888-9 forty-nine per cent claimed to have had gymnastic work, which shows recent increase of interest in the subject. Nine per cent, however, worked privately, instead of in school,

and three per cent had work which was of no value. These facts may be taken fairly to represent the physical education now given to girls in the best schools of the United States; that is, sixty-three per cent of the school-girls have no attention whatever paid to physical training. Only ten students of this thirty-seven per cent of seven hundred had their work under the direction of a physician, or were examined by a physician before undertaking it. Yet, in making a diagnosis of the heart and in examining the back for asymmetries, I find that the proportion having organic heart disease and lateral spinal curvature, as well as other defects, is the same among those who have had gymnastics (school or private) as among those who have not. Such conditions require special attention. It seems to me that this indicates that whatever system is adopted by the public schools, it is necessary, hand in hand with it, to have a medical examiner, who shall be a competent physical diagnostician, and whose duty it shall be to examine the pupils before they take any gymnastic work.

Dr. HARTWELL. — Those physicians who have seen many cases of curvature of the spine would say, I think, that a large percentage of the cases are furnished from among school children. You might almost say that such deformities are promoted by school habits, improper desks, bad positions — especially in writing and drawing. For a good many years it has been a rule in Sweden for the government to appoint a physician as medical officer, to examine the scholars in the schools a stated number of times during the year. The school physician's report is made to the Department of Education. This officer is superior to the teachers of the school. If he finds pupils puny, anæmic, hectic, or otherwise unfitted for the ordinary school work, he has the power to say this child has too much school work, or this child must have no home lessons, or he must stay out altogether, or do so and so. If he finds physical deformity; if he finds a child with a beginning of scoliosis, or curvature of the spine, or with any other affection which should prevent him from taking the regular gymnastic exercises, he forbids the child to take such exercises. If the child, in his judgment, should have special medical gymnastics, the teachers in many schools are so well trained that they know how to give the medical gymnastics. I have no hesitation in saying that the Royal Central Gymnastic Institute in Stockholm is the best school for training teachers of gymnastics in the world. It will be seen from what I have said that Sweden has already adopted a system of medical supervision for schools such as Dr. Putnam regards to be necessary.

QUESTION. — Does that medical inspector have the power to inquire whether these deformities are caused by school work or by something out of school?

Dr. HARTWELL. — I think he has power to review all questions.

Adjourned.

Third Session.

The conference met Saturday, November 30, at 10 A.M., and was called to order by Dr. Harris. The first paper was read by D. A. Sargent, M.D., of Harvard University.

THE SYSTEM OF PHYSICAL TRAINING AT THE HEMENWAY GYMNASIUM.

BY D. A. SARGENT, M.D.

IN order that I may give you a comprehensive idea of the system of Physical Training pursued at the Hemenway Gymnasium, it will be necessary to refer at the outset to its history and development.

As this is closely connected with my own experience, I shall be obliged to give you a brief autobiography.

In the fall of 1869 I accepted a position as Director of the Gymnasium at Bowdoin College, Brunswick, Me.

At that time I began to make measurements of students, and to observe the differences in size, strength, and development that characterized different habits and conditions of life.

Two years later attendance at the gymnasium was made compulsory to all classes, and I was called upon to devise a system of exercises that would be at once efficient, progressive, and popular.

In thinking this matter over I could not shut out from my mind the marked difference in physique of the men who had come under my observation. Some of them were six feet in height, and weighed over two hundred pounds; others had a stature less than five feet and weighed under one hundred pounds. Some could lift a thousand pounds and push their weight up between the parallel bars from twenty to forty

times, while others could not lift one-tenth of this amount or push their weight up once.

Had these young men been required to pass a physical examination and come up to a certain physical standard before entering college, the task of devising a scheme of appropriate exercises would have been a simpler one.

To expect that a class of individuals, varying between these extremes, could be grouped together and given the same kind of exercise with any hope of benefiting all seemed to me little less than absurd. Yet this was the Dio Lewis plan, and I had no other system before me, in America, as a guide at that time.

In looking over the records of the students I had examined I found that the young men who had been accustomed to walk long distances to and from school, and to spend certain portions of the year doing manual labor on farms, in mills, lumber yards, etc., generally showed a superior physique, unless the work had been excessive and begun at too early a period. Moreover, I found that the young men who had been accustomed to special employment, such as blacksmithing, wood-chopping, milking cows, etc., showed a special development in certain parts of the body, as the forearm, upper-arm, and back, while they were lacking in the development of other parts.

In this way I went through the list, marking the peculiar development that seemed to accompany the special occupations and exercises to which the boys had given attention before coming to college.

The conclusion that I reached was this: If actual labor will produce such good physical results in certain directions, why will not a system of exercises in the gymnasium, resembling actual labor, accomplish the same result in opposite directions, and in this way be made to supplement the deficiencies of one's occupation, and to develop him where he is weak.

With this idea predominating, I began to work for its attainment in 1871.

The nearest approach that I could make to the realization of this idea at Bowdoin College, for lack of funds, was the establishment of a lot of crude pulley-weight appliances of different

heights and weights, to which I introduced the students as a class exercise.

Pulling window-weights over a wooden roller by aid of an iron handle, in a cold, unfinished building, four times a week, did not impress the faculty as an exercise that would be likely to add to the popularity of the required system, and I think that they had some doubt as to the expediency of letting an instructor, "who was only a freshman," try the experiment. The experiment was tried, however, and it proved so successful that I was able to leave the department the next year in charge of assistants, who were also students, and spend three months in New Haven, trying to introduce the same system at Yale College.

I mention this fact in order that you may see that the success of the new movement was largely due to the peculiarity of the exercise, and not to any personal force or character behind it. In fact, I now know that I hit upon one of the great principles that should govern all artificial exercise, without knowing it. (Of this I shall speak later.)

I ought to add that we used the wooden dumb-bells and Indian clubs to alternate with the pulley-weight appliances in class exercises.

For the result of this system of exercises upon the growth and development of the students at Bowdoin, I must refer my hearers to the tables published in Mr. Blaikie's admirable little book, "How to get Strong."

After the completion of my medical studies, in 1878, I elaborated my old system of measurements, and had the first patterns of my long-contemplated developing appliances constructed.

These consist of what are familiarly known as chest-weights, chest-expanders and developers, quarter-circles, leg-machines, finger-machines, etc., to the number of forty different pieces.

These appliances were first used in my private institution in New York City in 1878, and were placed in the Hemenway Gymnasium in 1879. It would seem that this style of apparatus met a long-felt want, for it immediately sprang into popular favor.

As it had been publicly announced that these appliances were not patented, but were given to the public for educational pur-

poses, they were soon copied in one form or another by various manufacturers, and have since been generally introduced into the school, college, athletic club, and Young Men's Christian Association gymnasias throughout this country, and in different parts of Europe.

To what extent this style of apparatus is now used in the United States may be inferred from the fact that some of it has been put into three hundred and fifty or more institutions, representing a total membership of over one hundred thousand.

Thus it will be seen that the system to which I invite your attention is not a thing of recent growth, but one that has been undergoing a process of slow development for the past twenty years.

That you may understand what it is in its present form, as carried out at Harvard University, let me ask you to follow me through one of the physical examinations of a student, and see what we do for him. Every student who enters the University is entitled to an examination, and eighty-seven per cent of the whole number avail themselves of this privilege.

As soon as the student presents himself at the director's office (which is done by application and appointment), he is given a history blank, which he fills out, giving his birthplace, nativity of parents, occupation of father, resemblance to parents, natural heritage, general state of health, and a list of the diseases he has had, all of which information is absolutely necessary in order for the examiner to put a correct interpretation upon the observations to follow. The student is then asked to make certain tests of the muscular strength of the different parts of his body, and to try the capacity of his lungs.

He then passes into the measuring room, and has his weight, height, chest-girth, and fifty other items taken. His heart and lungs are then examined before and after exercise, and a careful record made of the condition of the skin, muscles, spine, etc., which the tape measure fails to give.

All the items taken are then plotted on a chart, made from several thousand measurements, and the examiner is then able to know the relative standing of this individual as compared with others for every dimension taken, also his deviation from

symmetry and the parts which are in special need of development.

To confirm the plotting of the chart, and to awaken in the young man a genuine interest in his physique a photograph of each student desiring it is taken in three positions, and preserved for comparison with those to be taken of him later.

From the data thus procured a special order of appropriate exercises is made out for this student with specifications as to the movements and apparatus he may best use. At the present time this special order consists for most students of an illustrated handbook, in which the apparatus, the weights for it, and the times to use it are carefully prescribed, together with such suggestions as to exercise, diet, sleep, bathing, clothing, etc., as will best meet the needs of the individual under consideration.

Now I think it will be admitted by all thoughtful persons that one-half the battle for mental education has been won when you arouse in a boy a genuine love for learning. So one-half the struggle for physical training has been won when he can be induced to take a genuine interest in his bodily condition—to want to remedy his defects, and to pride himself on the purity of his skin, the firmness of his muscles, and the uprightness of his figure.

Whether the young man chooses afterwards to use the gymnasium, to run, to row, to play ball, or saw wood for the purpose of improving his physical condition matters little, provided he accomplishes that object.

The modern gymnasium, however, offers facilities for building up the body that are not excelled by any other system of exercise. The introduction of the new developing appliances has opened up the possibility of the gymnasium to thousands to whom it was formerly an institution of doubtful value. The student is no longer compelled to compete with others in the performance of feats that are distasteful to him. He can now compete with himself,—that is, with his own physical condition from week to week, and from month to month. If he is not strong enough to lift his own weight, the apparatus can be adjusted to a weight he can lift. If he is weak in the chest or the

back, he can spend his time and energy in strengthening those parts without fear of strain or injury.

In fact, he can work for an hour, going from one piece of apparatus to another, keeping always within the circuit of his capacity, and adding slowly and surely to his general strength and powers of endurance. If the heart is weak, the lung capacity small, the liver sluggish, the circulation feeble, or the nervous system impaired, etc., special forms of exercise can be prescribed to meet these conditions.

Gentle running is usually advised as a constitutional exercise for all of those who can take it. This is usually severe enough to start the perspiration, and make a bath of some kind desirable. A tepid sponge or shower bath is generally advised; and in my opinion, the bath which regularly follows the exercise at the gymnasium, and the habit of bathing established thereby, is almost as valuable as the exercise itself.

After a period of six months or more, the student returns again to the Director's office, and has another examination, in order to ascertain what improvement he has made, and to receive any new suggestions.

This, in brief, is the educational part of the system of physical training carried on at the Hemenway Gymnasium.

The system of athletics and heavy gymnastics carried on at the college during term time the authorities are in no way responsible for. These are managed by the students themselves through their different athletic organizations. The faculty exercise a conservative influence, in requiring every man to be examined and get a certificate from the Director of the Gymnasium before he can enter as a competitor in athletic contests. By taking this precaution, many a student, whose zeal for athletics was in excess of his ability, has been undoubtedly saved from injury, and the character of the sport has been maintained. The authorities believe that athletic sports, kept within bounds and carefully regulated, are a valuable adjunct to our system of physical training, and they are constantly making endeavors to increase Harvard facilities in this direction.

Some of us believe it is more to the credit of a university to have one hundred men who can do a creditable performance in

running, rowing, ball-playing, etc., than to have one man who can break a record, or a team that can always win the championship.

The great aim of the gymnasium is to improve the physical condition of the mass of our students, and to give them as much health, strength, and stamina as possible, to enable them to perform the duties that await them after leaving college. How well this work is being accomplished I hope to be able to show at some future time. Just at present I will only make one statement, which has been made before, but which some of you may not have heard.

We have to-day on our record books at Harvard the names of two hundred and forty-five students whose test of general strength (of arms, chest, back, legs, lungs, etc.) surpasses the test of the strongest man in 1880. (The Gymnasium was opened that year, it will be understood, and few of the men then in college had been in the habit of taking systematic exercise.) To-day we have over twelve hundred men who attend the gymnasium more or less regularly.

While the number of the men coming to the University has increased fifty per cent during the past ten years, the number using the gymnasium has increased over one hundred and fifty per cent during the same interval.

Perhaps the most important work the University is doing in the way of physical training is at its Summer School for Teachers.

This has only been established three years, but within that time we have had one hundred and sixty-one pupils. The most of them were teachers in physical exercises at colleges and secondary schools in different parts of the country. Among the list were several physicians, thirty-two college graduates, army officers, school superintendents and principals, and many teachers and professors in other branches, who attended for their own improvement or in the interest of the institution which they represented.

The list of instructors last summer comprised seven physicians, six specialists, and seven student assistants. The theoretical work of the course comprised lectures and recitations in

the Elements of Applied Anatomy and Physiology and in Personal Hygiene; also lectures and practical talks on Anthropology, Anthropometry, Physical Diagnosis, Methods of Prescribing Exercise for the Individual, Physical Exercise in the Treatment of Spinal Curvature, Testing for Normal Vision and Hearing, and Massage and its applications.

The practical work of the course consisted in Free Movements, Calisthenics, Light Gymnastics, Marching, Methods of Conducting Squad, Class and Division Exercises, Gymnastic Games, Heavy Gymnastics, Track and Field Athletics, Physical Examinations, Practice in Measuring and the Use of Testing and Developing Appliances, Boxing, Fencing, Swimming, and Voice Training.

This school is restricted in its usefulness by the little time that can be devoted to it. But as most of the teachers have had considerable experience, and are tolerably well trained by preparatory study and physical exercises before coming to the school, the amount of efficiency acquired is greater than would at first seem possible.

At my private gymnasium (which was established for the Harvard Annex) I have had a normal class for women for the past eight years, and it was in this humble institution that most of the teachers now directing the gymnasiums of our large colleges for women were trained.

Now that the subject of physical education is before the public, and a popular sentiment seems to be setting in this direction, there is not a little danger that it may lose its force, or be turned in wrong directions by the over-zealousness of some of its teachers and advocates, and the extravagant claims of a certain class in the community who wish to reap a pecuniary profit from the movement.

When gymnasium instructors arrange a new order of exercises and claim to have invented a system of physical training, when machine companies and manufacturing establishments issue papers and books of instruction in physical exercises, and the apostles of physical culture who have no gymnasiums make a virtue of necessity, and claim that change of clothing, bathing, and the use of apparatus are not necessary for the perfect develop-

ment of the body, it is well for those having the best interests of the rising generation at heart to ask themselves a few questions.

Have the experience of other nations, and the history and biographies of peoples and individuals distinguished for health, strength, and powers of endurance, taught us nothing?

Have the researches of the anatomist, physiologist, and scientist during the past century thrown no light on this subject? In other words, have we discovered no broad underlying principles upon which the subject of physical education rests?

It seems to me that we have made great progress in this direction, and some of us are working according to principles which, if not true, should, in the interest of the cause, be refuted.

I have given some idea of the practical working of our system at Cambridge; now let me invite your attention to a consideration of some of the theories and principles upon which it is founded.

"The characteristic physiological property of muscular tissue, and that for which it is employed in the body," says Martin,¹ "is the faculty possessed by its fibres of shortening forcibly under certain circumstances." This property is called contractility, and upon the full performance of this function depends not only the healthy condition of the muscles, but of the various parts of the body with which they are connected.

Now, what are the circumstances under which a muscle performs its greatest contraction?

1st. "There must be a succession of strong and oft-repeated *stimuli*. 2d. The muscle must have a load to carry or resistance opposed to its shortening."

This can be illustrated by the experiment so often conducted in the physiological laboratory. Take a muscle without a weight attached to it, and apply a stimulus. The muscle will contract say a quarter of an inch. Now apply a weight of one pound to it and apply the same stimulus. The muscle will contract half an inch. Attach a still heavier weight, say two pounds, and apply the same stimulus, and the muscle will contract one inch.

¹ "The Human Body" (Chapter x.), by H. Newell Martin, D.Sc., M.A., M.D.

And so the experiment could be carried on until a weight was attached which would cause the contractions of the muscles to be less and less until they finally ceased. "So that up to a certain limit, resistance to the shortening of a muscle makes it more able to shorten, and the greater extension of the muscle due to the greater resistance opposed to its shortening puts it into a state in which it is able to contract more powerfully."

Upon the interpretation of this simple physiological fact depends the foundation of two great systems of physical training—one faction advocating that the antagonizing muscles in free movements, without apparatus, furnish all the resistance that is necessary; while the other faction claim that the resistance afforded by opposing muscles is not sufficient, and that weights of some kind, or apparatus, is necessary to bring out the working force of the muscle used.

I believe that the last conclusion is the correct one. The study of the human skeleton as a whole and in parts, the peculiar formation of the tuberosities and prominences of the bones, and the size and strength of the muscles attached to them, all go to show that the limbs were not only designed to be moved, but to help man bear his burden, overcome obstacles, and fight his way in the world.

Where do we look for the best specimens of physical development but to those engaged in all-round, vigorous, manual labor? Yes, as Maclaren says, "exercise, which is voluntary labor, must resemble actual labor, if it be desired to obtain from it the physical advantages which actual labor bestows."

The work done by a muscle in a given contraction when it lifts a weight vertically against gravity is measured by the weight moved multiplied by the distance through which it is moved. This test furnishes the best means of judging of the efficiency of a system of exercises.

We saw in the laboratory experiment that when the muscle simply lifted its own weight that it did no work, and that nothing was accomplished when it tried to lift a weight too heavy for it, but that there was an intermediate weight that it lifted to the greatest height, and did the greatest amount of work.

What is true of this single muscle is true of all the muscles of the body ; there is a certain weight with which the different groups of muscles can do the most effective service in a given time. If the weight is too light or too heavy, the best effect of the exercise is not realized.

This may be illustrated by the familiar use of the chest-weights (so-called). If you go through the movements without any weight, the exercise is insipid. If, on the other hand, you load the boxes up to their full capacity, you will find that there are only one or two movements that you can do, and these only for a minute or so. Now, if you have carefully gauged your strength to about five pounds (which is, perhaps, the average weight used in these appliances), you will find that you can go through the full set of exercises (comprising some forty or fifty separate movements) and feel that you have accomplished something that will be a benefit to you. This statement is equally true of all the different developing appliances found in a well-equipped gymnasium ; and to the fact that our modern apparatus can be adjusted to the strength of the strong and the weakness of the weak may be attributed a large part of the value and popularity of those thriving institutions.

But there is another principle now taken advantage of, to which the modern gymnasium owes a great part of its efficiency. In view of the tendency of the times I cannot help thinking that it is a valuable one.

In primitive races individuals of the same tribe bear a close resemblance to each other. As they progress in civilization difference of function begins to work a difference in structure ; and we begin to get a marked variation in size, form, and feature.

In highly civilized communities the minute division of labor carries this variation still further ; so that it is not only possible in many cases to distinguish individuals by their calling, but the particular branch of work in which they are engaged can be easily determined by its influence upon their physical structure. In other words, men are moulded by their trades and occupations, and many of the diseases with which they are afflicted arise from physical defects due to faulty positions and want of

appropriate exercise. Perhaps no class in the community have their physical characteristics more marked than the student-class. The type may be distinguished by a drooping head, flat chest, hollow back, and constricted ribs just over the stomach. It is not necessary to look for the causes of these defects. They are faulty positions while studying, pressure of the desk against the body, the constriction of clothing during the growing period, the relaxed state of certain muscles, and the overstrained condition of others.

Most occupations, including that of the student, tend to overuse the flexor muscles and to compress and constrict the body, thus lessening its internal capacity and interfering with the functions of important organs. Thus the resistance of the clothing, weights lifted and borne on the back or shoulders, and even the use of heavy dumb-bells for health's sake, all tend to force the ribs downward and lessen the diameter of the thorax. To remedy this evil a system of artificial exercise is necessary.

Just here we touch upon a principle that has escaped the attention of most teachers. If this deformity is brought about by the natural action of the muscles, that is, by their acting centripetally from their origin to their insertions, surely the remedy is to make them act centrifugally from their insertions to their origins. By grasping a bar or a pair of rings above the head, the parts where the muscles are inserted become fixed, and if the muscles contract, the parts from which they originated must move. In this case all the diameters of the thorax are increased and the chest capacity enlarged. In this principle lies the value of the rings, trapeze, ladders, parallel and horizontal bars, and in fact all of the climbing appurtenances to those who are able to use them. By the invention of the chest-expander, chest-developer, quarter-circle, high pulleys, and inclined planes, travelling parallels, and similar apparatus, the same principle can be applied by any one, however weak, and the same result can be accomplished. It requires a little more time, but the effect is likely to be more durable.

By the use of the pulley-weight system, resistance can be applied to any part of the body from any direction. In this peculiar property lies its great value as a means of enlarging

the thoracic cavity and counteracting the cramping and constricting tendencies of modern occupations.

I have dwelt upon these principles at some length because I have reason to believe they have not been well understood by persons interested in the subject. Some of the other theories that have guided me in formulating a system of exercises I shall state briefly in the form of a summary, together with those I have just mentioned.

As far as I have been able to discover, they are based on sound physiological principles.

(1) The person should be sufficiently interested in the exercise to give it his attention in order to secure the necessary volitional power to start the movement. Whether the exercise is interesting in itself is a matter of little consequence.

(2) There should be a weight or resistance to overcome in order to bring out the working force of the muscle. In using a weight the muscle gradually acquires the force with which it tries to contract.

(3) The exercise must be performed with sufficient vigor and rapidity to engage the energetic contraction of the muscles employed. When this is done, old tissue is broken down, and its place is supplied with new material in increased quantity, thus augmenting the size and strength of the muscles.

The brain gains the power and energy which the exercise requires it to put forth.

(4) Weak parts must first be strengthened, and then as many muscles as possible must be brought into action in order to secure a full-orbed and harmonious development of the whole body. One-sided development is usually attained by robbing some other part of its just share of the body's nutriment.

Most persons in their daily occupations use the flexor muscles more than the extensors — thereby cramping the vital organs and interfering with their functions. To remedy this tendency the muscles should be made to act from the centre as far as possible in all forms of artificial exercise.

(5) A sufficient number of muscles should be called into action at one time to stimulate the action of the heart and lungs and in-

crease the circulation and respiration. This is one of the most important considerations to bear in mind in regard to exercise. To keep up this increased respiratory activity, and to aid the heart in removing the waste material and hastening forward the new, the limbs and walls of the chest must be absolutely free from any ligatures or constrictions. The slightest interference with the action of the respiratory muscles at this time embarrasses the functions of the lungs and heart. This is the reason why loose clothing is always advised for exercise.

(6) As a latent period precedes the contraction of a muscle, so a momentary period of rest should as far as possible precede movement in exercise. This is best secured where there is an alternation in the movements, as in walking, running, rowing, etc. All tetanized movements, such as holding weights, attitudinizing, standing or sitting in a constrained position, etc., tend to impair the tone of the muscles by interfering with the nutrition of both muscles and nerves.

(7) The exercise of the young should be of such a composite nature as to bring about the co-operation and co-ordination of the muscles. This involves principally the training of the central nerve system. All gymnastic sports and athletic games that require skill, dexterity, coolness, courage, and presence of mind, are included in this list, and are exceedingly valuable to any system of physical training, as adjuncts in the development of character.

(8) All vital processes depend largely upon the maintenance of animal heat. But animal heat is now known to be generated in the blood while passing through the muscles, and not in the lungs, as was once supposed. The full contraction of the muscles greatly aids this function, and helps to force the warm blood through the tissues and back again to the heart.

(9) In order to realize the best results from physical exercise and keep up the general nutrition of the body, all muscular effort should be followed by a bath or vigorous stroking and rubbing.

(10) In every kind of physical exercise the qualities at first required are the qualities at length developed. Thus, if the exercise requires strength, strength will be the result; if cour-

age is exacted, courage will be the outcome; if quickness, quickness; and so through the whole range of faculties exercised.

Knowing what is desired, it is an easy matter to prescribe the appropriate training. In this very fact lies an element of danger, which it is well for us to consider. There should be a better understanding of the physiology of exercise, a recognition of the supreme value of unity in development, and more information as to what constitutes the normal man for different races, ages, and conditions of life.

Until these questions are settled there will continue to be the widest difference of opinion as to the kind, amount, and place of physical training in a scheme of education. The present aspect of the subject in Europe and in this country furnishes illustrations to the point.

Germany, tired of the dull, stereotyped exercises of the Turnverein, is making a plea for sports and games; old England and our New England, perplexed with athletics run wild, are attempting to substitute a rational system of exercise for competitive sports; while France and Sweden are beginning to realize that calisthenics and free movements, though beneficial to the graces, afford little or no exercise as such. Yet these are the nations that gave us our first ideas on the subject.

What America most needs is the happy combination which the European nations are trying to effect: the strength-giving qualities of the German gymnasium, the active and energetic properties of the English sports, the grace and suppleness acquired from the French calisthenics, and the beautiful poise and mechanical precision of the Swedish free movements, all regulated, systematized, and adapted to our peculiar needs and institutions.

The highest development of strength, activity, and grace is not compatible in the same individual, and consequently many persons prefer to sacrifice one in order to gain the other. But robust, vigorous health is only maintained in a body in which life's forces are well adjusted and well balanced.

The discussion was opened by Walter Channing, M.D., as follows :—

Dr. CHANNING. — As I understand the subject of this Conference is physical training in schools, I shall limit my remarks to that subject. I suppose we are all laboring for the same end, yet we have too much to say about *systems*. Who, I may ask, can lay claim to any special system? Is not the work done by different investigators partly founded on the accumulated experience of others and partly on their own ideas?

Ling was the man who adapted rational mechanical movements to the principles of what the organism demanded. He was able to both establish principles and put them to the best of successful practice. In as far as this, and only as far, are we bound to follow him.

The questions with us to-day are : 1st, What are the principles which should guide us in the physical training of children? and 2d, how can these principles be applied? We saw and heard yesterday a good deal of the application, but little, I regret to say, of the underlying principles.

We had, for example, exhibitions of the "German," "Swedish," and "American" systems, as they were called, though I should be more inclined to call them the systems of a German gentleman I do not know the name of, Mr. Posse, and Mr. Roberts, late of the Young Men's Christian Association Gymnasium. They were all admirable in many ways, and yet how easy it is for us all to criticise them.

Some of the exercises were too hard for young children, especially girls; some over-trained the attention, others were too heavy and wooden, and especially too great prominence was given to a high degree of excellence, producing an almost painful tension, it seemed to me.

Such objections as these could be multiplied, and more specifically stated, but that is not exactly what I wish to bring out.

What *do* we want to accomplish? Let us remember first of all that we want to take a lot of young, immature, active, restless, often ill-nourished little creatures, and big ones too, for that matter, not classes of adults, and so guide and direct them that the existing faulty physical conditions may be overcome and the foundations laid for future physical health.

Let me pause here a moment to lay emphasis on the necessity for such a foundation. Let us remember that a correct method of physical training is the chief means by which we may hope to overcome and prevent the tendency, now so common among us, to mental and nervous instability and degeneracy; a tendency, I may say in passing, due to no one cause, but *excess* in various directions.

We must then have the most simple, varied, and active exercises for the youngest children, naturally growing harder as the children advance in years; and we must have plenty of oxygen and inspiring surroundings, otherwise the solemnity and depression of the school will deprive them of much of the desired benefit.

In the higher schools the exercises must be neither between, on top of, nor under the desks, but in a well-equipped gymnasium.] It is useless to think of avoiding expense in this direction, for the idea of progression in work cannot otherwise be maintained, and the whole system would eventually die of inanition.

And we must have music too, for some of the movements can be *better* done to music. The time can be adapted to many movements, as I have demonstrated myself and seen demonstrated a thousand times, and no theories can upset the evidence on this point. Of course no one would think of jumping, or vaulting, or throwing bean-bags, or of cutting pigeon wings, or pirouetting to music. But exercises with dumb-bells, wands, chest-weights, and chest-bars will, in nine cases out of ten, be more effectually and enjoyably done *with* music than without. It is often a great gain to have less of the personality of the teacher, which often is liable to the little upsets which affect all human nature, and more of the soothing effects of the music, which tend to keep alive harmony and good feeling between teacher and pupils.

I have very serious doubts how much can be accomplished in the end, for purposes of the physical training of children, by the placing of their instruction in the hands of the ordinary teachers unless they have taken a regular graded course of several years in gymnastic work. It is in itself a many-sided profession, and requires both wide experience in studying the physical condition of many people, and enthusiasm to make its success assured.

Many ordinary teachers would never be able to instruct at all in gymnastics, even after taking special courses. The professional teacher would, however, be employed only for merit, and a much higher grade of work would be the result.

The great difficulty in making a success of gymnastic training in times past has been the tendency, from poor teaching and lack of interest in, and appreciation of, the work, to become more and more mechanical and circumscribed. A slow, lingering, and painful death would be the natural consequence.

There is less danger of this now, as more is known about physical training, and the demand for something to counteract the exhausting tendencies of modern life is imperatively thrust upon us.

To sum up my brief remarks, I would say in a word, we should adopt no so-called specific system, but take what is good in each without fear or favor; then place the whole carrying out of the plan in the hands of skilled professional teachers, preferably women, who have had an extended experience in the instruction of children. No others can fully estimate the high and responsible character of the undertaking. I have a strong feeling that women will make extremely good teachers, especially with children, who require so much patience and a knowledge of their particular needs which a man does not have, though he may have very good intentions. I was much interested in the paper of Dr. Sargent, for he presented the side of the heavy gymnastics admirably. We have got to take the best things out of each system and mix them all up and apply them as we see the need.

Miss LUCILE EATON HILL, Director of Gymnasium, Wellesley College. — I am very glad that I did not know I was to be called on, because in the excitement of the moment I may say something that I would not dare to say if I had time to think about it.

It seems to be the fashion to have a *system* of physical training, — then I am sure I have one. I shall call it “eclectic,” for I have endeavored to take the best ideas from all systems and roll them into a ball for Wellesley, to be unwound at our discretion.

But I hate the word “system,” — don’t you? I mean the running-in-one-track part of it, and being satisfied with one’s own ideas without recognizing the good in all methods.

I am sure Dr. Sargent would feel at home in the Wellesley Gymnasium, because we have the statistics of over a thousand women, and we use his system of measurements and strength-tests. Dr. Hitchcock would feel at home with us because the *minimum* amount of exercise in the gymnasium is compulsory, and we march very well indeed. Dr. Anderson would be at home because we could not swing Indian clubs as remarkably as we do *without* music, and Dr. Posse would be gratified if he knew that there are just as many exercises that he could not possibly perform with music! To General Moore we owe our enthusiasm for the “setting up” drill, and we have a real drum.

I want to speak in behalf of the little *girls* in our schools. I am sure it is because *they* need it so much that this great interest is shown in physical training. I do not think the boys are of quite so much consequence, — do you? “If strong be the frames of the mothers, the sons shall make laws for the people”; and we are working for the future generations; to be sure it is far-reaching philanthropy.

Let us fancy ourselves little girls, wriggling five hours a day on uncomfortable chairs, twisting ourselves into impossible shapes, not one of which affords the desired relief.

Do you blame us, little animals that we are, desiring the freedom of kittens and puppies and colts, if we demand the privilege of exercising vigorously and breathing deeply for five or ten minutes at the close of every hour, while cool, pure air rushes through the warm, close room?

I do not see why the regular teachers in the *primary, intermediate, and grammar* schools cannot be trained to lead their own classes in the various exercises, thereby benefiting themselves also. Mild competition should be encouraged between schools of the same grade, and opportunity afforded at the end of the year for public approval and the awarding of prizes. Of course (?) the teachers will be paid extra for this extra work.

But in the high schools, when little girls become “young ladies,” and can no longer romp out of doors with boys, because it is “unladylike”; when they begin to turn up their hair and lengthen their frocks, and put on corsets, I tell you it will take the combined wisdom of every specialist in the country to meet the needs of the case; and the only persons who can successfully do

this are *women*. I know you all agree with me. *Then* floor room must be given for more advanced exercises, with apparatus if desirable.

When our preparatory schools adopt a thorough course of physical training, the work of the directors of gymnasia in women's colleges will no longer be to correct the bad habits formed by lack of such training in public schools, but will be as far ahead of preliminary drill as higher mathematics is in advance of the multiplication table.

The object of such training should be the strengthening of the vital organs, the increase of lung capacity, the symmetrical development of the muscles, and the training of the nerves, keeping ever in mind the æsthetic importance of physical culture as well as the hygienic.

The Senior class of Wellesley College, the majority of whom become teachers, will be trained in the system adopted by our public schools, so they in their turn will be ready to continue the good work, and thus complete the "circle."

Is it not wiser to first show the members of the School Board what systematic thorough work we can do with the time and room they willingly give us (we *can* do anything with nothing, if we make up our minds to do it); then by and by will they not be so delighted with the results that they will be anxious to do more, because a *theory* has been made *practical*?

Dr. CAROLYN C. LADD of Bryn Mawr College. — I received a letter two weeks ago asking me to attend this Conference and to take part in the discussions. I said, in replying, that I would be present, and would take part if I had anything to say. Several times I have had things to say, but every time some one else has said that very thing better than I could have done. At present I have very little to put before you. I want first of all to emphasize the need of physical training for *girls*, from the age of twelve to the age of entering college, about eighteen or nineteen. As the speaker before me said, little girls get a fair amount of exercise because they play out of doors with their brothers. But from twelve to nineteen, during the time they are preparing for college, they have very little physical exercise or work, and that is the time when their bodies are forming, and they are laying the structure for the work of life, and it is the time when they should educate their bodies and develop their physical strength.

I had the pleasure of seeing the Swedish system in Sweden this last summer, and I found it very excellent in every particular. It seemed to me that one great cause of the excellence of its results is that the teachers are all well trained to carry out the system. And they are required to carry it out through all the board schools and those that lead up to the higher institutions. If we could get a system — Swedish, American, or whatever it might be — that could be thoroughly carried out in our common schools and the schools that prepare our women for college, then I think the difficulties that we are discussing would be done away.

Miss RUTH C. TOUSLEY of Jamestown, N.Y. — We have had gymnastics in our schools for twenty-five years. Our superintendent, Mr. Samuel G. Love,

came to Boston about twenty-six years ago and saw the exercises given by Dio Lewis. Since then we have had such exercises in our public schools, partly our own, partly Dio Lewis's, partly gained from Dr. Anderson at the summer school at Chautauqua. We take everything that we find will be helpful to the children. I feel that I have gained a great deal from being here. The Swedish system is entirely new to me, and I do not know whether it could be put into the public schools or not as it is. I find music is very attractive from the age of ten up. All the scholars of the high school go into the gymnasium some part of the day. They come in for a rest from their studies. We could not give the time to gymnastic work that they give in college; being under the supervision of the state, there is so much work required of us in other directions. The children enjoy the exercises very much. One of our little schemes to encourage them in their work is to say, "I would like to see how well you can do it, how well you can carry yourselves, and I will know by that how you enjoy coming here," and it is interesting to see how they brighten up and how well they do. After hearing our college professors I find I know very little about the work, but I am glad to report that we have had physical exercises ever since our high and grammar schools were organized in our little city, which we consider a progressive one, and we stand ready to adopt whatever system is the best.

Mr. RAY GREENE HULING of New Bedford. — I suppose I am here because I have the capacity to learn, and not because I have any fund of knowledge which I can give to others on this subject. I am in the position of a jurymen, whether intelligent or not will depend on the character of the message I bear home with me. Certainly I came with one quality which the lawyers like in a jurymen, — the absence of preparation for the decision of the question before us.

I listened yesterday with intense interest to all that was said to us, and faithfully used my eyes (and my spectacles) in observing the exercises; but I was impressed more than anything else with the fact that it was all in great measure above the level of the common schools of Massachusetts. It seems to me that a system, to be used with advantage in our public schools, must be not only devised by physiologists and physicians and by those who are trained in various methods of applying the principles of physical growth, but also revised by experienced school teachers. I have been very glad to hear quite a little said this morning about the limitations which the school-room evidently puts upon any system of physical education. The school-room is not a perfect appliance in any sense. Its main work is intellectual education, but that can be done only to a limited degree. The school has another side, that of morals, and moral education is an even more valuable product than mental education; yet this work it can do only fairly well. But to physical education the school-room is adapted least of all. Consider the one element of time. I asked my superintendent of schools yesterday, "How much time, on the average, can you allow to be given in the public schools of our city to physical education?" "Well," said he, "to begin with the primary schools,

twenty minutes a day; in the higher classes, not more than fifteen minutes a day." I turned this morning to a gentleman of large experience in public school-teaching, and asked him how much time could be given to this work in the large cities. "Not more than ten or twelve minutes, with our present course of instruction," he said. And now I venture to ask Dr. Sargent how much of his admirable system could be accomplished in ten, twelve, or fifteen minutes a day, through the school life of the boys and girls? It is evident that we must appeal to the practical experience of our teachers before this problem can be solved.

I trust that the outcome of this meeting will not be simply the separation of the different members of it, and a carrying away of confused and scarcely crystallized opinions to the different parts of the state, but that there will be provision made for the appointment of a commission which shall consider this whole subject from the point of view of experience, and that a report will be made through the public press at some later time, giving a definite plan on which the common schools, from the primary to the close of the high school, may begin to work. And I suggest that a suitable composition of that committee would be to have gentlemen like Dr. Sargent and Dr. Hartwell, who should represent the physiological side of the question, and two others who should know the public schools of the state completely, and a fifth person who should be a lady, a lady trained to observe boys, and especially girls, from the point of view of physiology, if possible a physician who has also been a schoolma'am.

Dr. L. V. INGRAHAM. — I have been interested in physical training for about five years, from a medical standpoint. I have been connected with a gymnasium for working girls, and have seen a good deal of regular school work in two of the leading private schools of this city.

My experience confirms what has been very admirably stated, and what I think has been proved by the experience of¹ Sir Edwin Chadwick of England in connection with "the Factory Act"; viz., "*the receptivity of the minds of the great mass of children for direct instruction does not exceed three hours daily.*" This statement is confirmed by all of the leading physiologists. I consider that before anything can be properly done in connection with the physical training of boys and girls we must do away with flooding them with words, thus wrapping things up in mysteries which the little brain cannot unravel. Mental instruction should be interlarded with physical and manual training. Let the manual training come when the child is fourteen or fifteen years old. Let the child up to that time have ample recreation and out-door exercise, and whatever exercise is deemed proper for winter months be used under proper circumstances and in sufficient amount. We must consider this thing not entirely from the point of view of the boards of education. I bow in all honor to the boards of education; but they should not say that we can only have twenty minutes a day for the children's physical development, just

¹ "The Health of Nations," by Sir Edwin Chadwick, edited by B. W. Richardson, Vol. I. p. 228.

because we may never have had any more time for it. Let us not go on in a track because it has been long travelled. I suggest this, being very much interested in this work, and from seeing the effect of *so-called* overwork in the schools. I do not think mental training is thought by physicians to keep children from being well, but rather the keeping them still too long at a time — the want of variety in work and position; keeping them nominally at work when no impressions are made, and nothing gained except weariness, this surely is not mental training. I think, if the time for direct instruction were reduced, and we could introduce a sufficient amount of physical and manual training to break up these periods somewhat, that the problem would be more nearly solved. But it is a matter of evolution, and it will take a long time to reach a happy solution.

Mr. WHITTIER of Bowdoin College. — I think that in many respects this is a remarkable gathering. Here we are, all the various schools of gymnastics, each bringing forward its own system. And it is a great thing for physical culture that the different schools can meet together in this way. Imagine, if you can, the different schools of medicine — old school, homœopathic, Christian science, and others — coming together in a conference and discussing the relative merits of their different systems. It would take all the policemen of the city to control such a gathering. It has been made evident here that there are many systems of physical training, and the fact that the doctors of physical training disagree in regard to their respective merits, as they certainly do, may seem to a great many to throw discredit on physical training as a whole. But there are two reasons why doctors disagree in this. One of them was put forward yesterday; it is on account of the individuality of the teachers. Dr. Hitchcock finds that he succeeds best with one system; Dr. Sargent succeeds best with another system. Then another reason is, that different pupils need different systems. Suppose Drs. Sargent and Hitchcock should change places. I have no doubt that if Dr. Hitchcock came to Harvard, and Dr. Sargent went to Amherst, they would have to modify their plans to suit the different conditions. We saw yesterday a plan of exercises as carried on by the Young Men's Christian Association. I believe that for those associations that plan is a very good one; but I do not think it would do for a plan of exercise for our colleges. You must change your plan of work to suit your conditions, and each teacher must map out a plan to suit himself. I have been much interested in the Swedish system as it has been shown here. I think there is a great deal of good in it; but there is much in it that I do not believe in. I find in many cases that Indian clubs give a good form of exercise. I also believe in the occasional use of music. Again, it seems to me not quite right to claim that certain exercises are not gymnastics, as, for instance, the crossing of the arms, which brings into play the muscles in front of the chest. We have those muscles given to us, and I think it is natural for us to use them. Certain exercises have been condemned as not gymnastic, because they bring us into cramped positions. It is a good thing to be brought into cramped positions sometimes, *provided we*

do not stay in them. We shall be obliged to take such positions occasionally all through life, and it is well to get used to them. I think we can gain a good deal of information by watching children in their play, especially youngsters from two to four years old, as they tumble about on the floor. Theirs is the natural system, the system that nature leads them to adopt. Don't you see them getting into cramped positions? As they grow older, if their play is natural, they will use every muscle that God has given them. When they are older yet, if they are boys, and play foot-ball, they will often get into positions that are a trifle cramped, and no very great harm seems to result from it. Our system of physical education should be a natural one, so far as possible. We should try to copy from nature. It has been said that gymnastics is an artificial thing, and so it is. Our whole lives, under the modern plan of civilization, are artificial, and we have to use an artificial system of gymnastics to balance the artificiality of our lives; but in doing so we must copy nature as far as possible. We must use all the muscles that we have, and to an extent proportionate to their importance. I do not believe in outlawing a set of muscles altogether, because they cramp the chest when over-developed. It does not do for us to set up the claim that one muscle is wrong and should not be used, because they are all given to us to be used.

At Bowdoin College we have a graded system of physical exercises. We have Dr. Sargent's system entire. When a man comes to college, he is examined according to Dr. Sargent's plan; exercises are prescribed for him; an illustrated handbook is given to him, with prescriptions fully made out to suit his individual case. The chart used at the Hemenway Gymnasium is also given, and every effort is made to interest the young man in his physical self. In addition to this, a graded system of class exercise has been mapped out. The Freshmen have military drill, Indian club swinging, and free gymnastics. The object of this first year's exercise is largely to strengthen the man, to straighten him up, to give him a good carriage, to get his round shoulders into position, to correct his drooped neck, and in general to strengthen the weak places. In the Sophomore year comes class work with wands, dumb-bells, and other light apparatus. In the Junior year we pass on to a different style of class work. Here we introduce fencing with single sticks, and exercises of that character. In the Senior year we have fencing with foils. The men also receive careful training with the heavy apparatus of the gymnasium. Each class is divided into three squads, according to strength and activity. The strong men are put into the first squad, and they are given pretty hard work. The weaker men are given less active work; and the weakest men, the third squad, are drilled the first year mainly on the chest-weights and other developing apparatus, while they are given more or less running and other constitutional exercises. This system of squad work is kept up through the course, making it more and more difficult as the men increase in strength. I believe that men get a good deal of mental as well as physical training from out-of-door sports. It takes a bright man to play base ball or foot-ball. It brings into play all the qualities that a man has. It gives physical courage, will

power, presence of mind, coolness in times of danger, and many other qualities that it is well to have. But the trouble with out-of-door sports is that the men who need the most of this sort of training get the least; and so we give gymnastic work, fencing, single stick, and other similar exercises to develop the same qualities,—physical courage, will power, self-control, and many others,—so that those who need this training most may get it, as well as those who need it least.

Of course a plan that works well in a college must be greatly modified when it comes to be introduced into the common schools. In fact, you could not have anything so elaborate. I do, however, believe that some of the same principles can be carried out. I think there is a field for gymnastics and physical exercise that reaches beyond the maintenance of health. There are a great many qualities of mind that are not developed by Greek, Latin, or mathematics that can be developed by physical culture. I think that the system which will ultimately be used in our public schools will be of gradual growth. We must take for it the best of all the systems that we have. Above all, the plan must be a natural one. It will be difficult to arrange such a plan. It is difficult to decide just how far the nervous system can be trained without carrying it to such an extent as to make the work a nervous strain. It is difficult to decide just how far the physical system can be trained without making the work a physical strain. The whole thing ought to be made a matter of careful consideration. I have no doubt it will be the work of years; but I believe that it ought to come, and that it will come.

Dr. Harris having occasion to leave the Conference, Gen. Francis A. Walker, president of the Institute of Technology, was called to the chair.

Gen. FRANCIS A. WALKER.—I feel it a great honor to preside for an hour over this distinguished body of educators who have met to consider what is certainly a most vital question, relating to our public school system of education. I am happy to have an opportunity to testify to my own deep interest in the matter. It seems to me positively shocking the way in which we abuse our little children. We take them at an early age and bring them into school-rooms almost always over-crowded, very often ill-ventilated, and place them at desks ill-constructed and ill-adapted to their physical needs. We keep them at work there in cramped positions, which even my friend from Maine would hardly justify as part of any gymnastic, for five hours a day during years. Whatever view a man may take of the function of the State as to the proper use of our schools, it seems to me too clear to need to be discussed that, if the State will exercise its power to take our children from us by force of law and place them in cramped positions and false attitudes for five hours a day, shut up like jack-knives, that the State has the right and it is its duty to, at least, undo the mischief it has caused. It ought at least to give the children time and opportunity to straighten themselves out, after all

the injury which has been done to them through these restrained positions and this repressed activity.

I am, myself, not so anxious about the functions of the State, or about the use to which we shall put our school-rooms and teachers, as to have any scruples regarding the further introduction of gymnastics into the schools, even beyond the point necessary to undo the mischief which the State has done. To my mind the sole question with regard to any proposed extension of the functions of the State is, Can the State in this way do a great good to the community without setting in motion any force that will produce ultimate evil or harm? Can any one doubt how that question would be answered in regard to the introduction of school gymnastics? The State can do no harm in this way; and it is within the power of the State to set in motion enormous forces for good.

In regard to any proposed use of our school-rooms and teachers, it seems to me that, again, the question is, Is this something which is of great importance to the future happiness of the pupils, and can or will it be done otherwise than in the school-room? I do not believe that the great majority of the children in our cities will learn, for instance, the proper use of the needle in their own homes; therefore, I believe in teaching the use of the needle in the schools. I believe, again, that the great majority of girls, as population is now constituted in our cities, will not learn to cook food properly in their own homes; so I believe in teaching this to them in the school-room. Again, the great majority of parents pay, and will pay, whatever you may say or do, little or no attention to the physical training of their children; they do not teach them to stand properly, to walk well, or to expand their chests and lungs; and as this will not be done in the homes, then, for Heaven's sake, let it be done in the schools!

General Walker then introduced Dr. C. W. Emerson, President of the Monroe College of Oratory of Boston, who read a paper on the "Laws to be followed in teaching Physical Culture," which was afterwards illustrated by a drill in light gymnastics by the pupils of the College.

THE LAWS TO BE FOLLOWED IN TEACHING PHYSICAL CULTURE.

BY DR. C. W. EMERSON.

THE good spirit manifested in this place is a liberal education in itself. The enthusiasm that has come to us, and that will come to us, and that we carry to our homes, will be of inestimable value. I do not consider it so necessary that we insist upon any particular system of physical culture as that we agitate the public mind concerning the value of physical culture. We are lethargic as a public on that subject; and although some one has said that there is now a little "Boston craze" started about it, the public at large is not awake to its value. The testimony brought in here from every source in regard to public schools, and the time they allow for physical exercises, is sufficient to show us that they have no idea of what physical culture requires. Why, it is astonishing to me, in view of the past and in view of the future, that men do not see that in a republican government we must depend upon the strength, the power, of the men and the women who carry it forward; that nothing is attained without the rounding of the whole man. I scarcely need to refer to the Greeks, and yet, so far as education is concerned, they have been the despair of all succeeding ages. We have had in no age schools to be compared in results with their schools. Nowhere else has there been such personal education. What did they lay as the basis? Physical culture. They built it all on that. It all grew out of that. In that is the secret of their success. We point to Greece for the greatest orator, for the greatest creative poet, for the first man in what we consider the highest mental philosophy. Plato intellectually stands at the head of all the philosophers of the world. We must remember then that that which made the Greeks what they were about four or five hundred years before Christ, was the natural

evolution from physical culture. We, in this age, have begun at the other end. We begin with the head, but I am glad to see we are beginning to recognize that the feet and the legs are of some value. If we introduce physical culture into our schools, it will create in them an entire revolution. The question seems to be, Have you anywhere a system that you can wedge in that will not take more than five minutes a day to make a strong man or a strong woman? That is the question before the country to-day. The liberality that has been exhibited here, by which each one has freely and good-naturedly expressed his own opinion without dictating to others, is very pleasant. It is remarkable, I think. The way this Conference has been carried forward is a model for all conferences. I have been in a great many so-called religious conferences, but I never in my life saw such a desire on the part of all to agree in disagreeing. We are bound to agree anyhow in the fundamentals. We come with that spirit, determined to agree, like the Frenchman and his wife. A year or two after his marriage the man was asked whether they lived together in peace. "Yes," was the reply, "we do, but we have to fight for it."

Now I would like to ask of any one who has a system that he loves as he does his own soul, if he would desire to have that system established by law in this country to the exclusion of all others? There is not a person here who would say this. The moment that you establish any system by law all progress in that system stops then and there; there is no more growth—except towards China.

I do not therefore wish to bring forward the advocacy of any particular system, but some principles that must be involved in all systems. And the first thing that I should mention is that we must see that the vital organs are lifted up to their proper altitude. There is no other physical defect so general as this, that the vital organs are from one to four inches too low among adults and youth down to the age of four or five years. The child, before he is three or four years old, has vital organs which are very high. After he has been in school a few years they gradually go down till you find they are much below the normal altitude.

As to the consequences, every physiologist will agree with me when I say that no vital organ below its normal altitude can perform its functions properly. The lungs will not consume the air as they should, the stomach will not digest food as it ought, the heart will not throw the blood with the vigor which is required. I want to say that this lifting the organs up does not necessarily consist in throwing the chest out. The lungs are not on the outside; they are in the trunk of the body, and as they are lifted up they throw the shoulders apart and broaden the back as much as they fill the chest. They enlarge the chest just in that region where Dr. Sargent says measurements are now made.

The question put before us by the President is to be considered in two forms: What is the relation of muscular action to the nervous system? and, What is the relation of muscular action to the vital organs? The President said that he should like to have this matter considered, how by physical exercise we could cure dyspepsia. I am sorry he is not here this afternoon, for I would like to tell him that I have never known of a case of chronic dyspepsia where the stomach was as high as it ought to be and the person had sufficient nourishment. And that reminds me that I have wondered if something could not be done to feed our children before we work them quite so hard. I have known more cases than I have kept record of, of persons cured of dyspepsia by muscular exercise. But the first thing is to lift the vital organs sufficiently high in the body. There is too much said about holding the shoulders back, as though they were given us to put behind us. The shoulders are on the side, where they belong, where they are ready for us to use. To get our lungs up it is not necessary to throw the shoulders back. To bend the back and bulge the front of the body forward is to sacrifice the back to a protuberance in front. It is an injury to the lungs and especially an injury to the stomach. I would rather see a person round-shouldered than to see his back driven in to get an expansion in front. Upon the normal position of the spinal column depend so many things. The motion of the ribs depends on it. Think of all the muscles attached to the ribs aside from the attachment of muscles to the column itself.

All exercises of the arms and the legs should be such as to more powerfully exercise the body than the arms and the legs themselves. The arms and legs may rest, but the muscles that surround the body are not to rest and were not destined to rest from birth to death. They have no period of rest. Here is a curious fact of observation, that the muscles around and over the vital organs, though not attached directly to any, — and the separation is clean and clear-cut, — yet there seems to be such a relation between any vital organ and the muscles over it that you can judge of it by the muscles over it. You can judge of the condition of the stomach by the condition of the muscles over it. Dr. Sargent would not need to ask a man how his dinner agreed with him if he could examine the muscles over the stomach. A person with chronic dyspepsia cannot bear to have the muscles over his stomach touched. If he happens to meet a blundering June bug he collapses. Why is it so? My opinion is that it is by reflex action from the brain. These muscles that hold the organs in place create such action and activity in the pneumogastric nerve that it carries life and animation to the stomach and liver. I know not how else to account for it, for it is an observable fact. I saw it first recorded by Dr. Jackson thirty years ago, as a record of his long experience with persons with dyspepsia and those who had what they called "liver complaint."

Action, exercise, should be so directed as to produce two benefits: first, the commonly acknowledged benefit to the blood; and, secondly, that which I wish to emphasize, the way respiration affects the organs below the lungs. The muscles that hold the stomach in place constitute a portion of the muscles of respiration; and therefore if a person breathes only in the upper part of the chest he does not exercise what is below the lungs. Deep, full breathing exercises the muscles round the waist and exercises the viscera. The contents of the viscera are thus moved, or their motion is quickened. I am aware, in saying this, that certain works in physiology declare that men and women ought to breathe differently; that, while men should take a full and deep respiration, women should not; that woman is not constituted so that she should, certainly after the years of puberty. Yet if you look at the muscles of respira-

tion, you find that they are precisely alike in men and women, and the stomach and the liver need the same motions in both sexes in order to promote their activity. I believe that gymnastics should be directed toward the blood-making power, that is, toward promoting the healthy activity of the organs contained in the trunk of the body that make the blood. You work your child's brain to its utmost capacity to learn certain things, and to be able to recite certain lessons. You are doing this for what? If I ask you if this is to go on all his life, you say No; that you are preparing him for life, giving general culture in the schools. Now think a moment. You give him these lessons to learn, while at the same time you weaken his brain. What can he do with this knowledge afterwards? It is not altogether the knowledge that a man possesses which gives him power, although knowledge is said to be power; but the question is, What can the man do with it? Has he added to his brain power by this study? Yes, provided that he makes blood enough for that brain, otherwise he has not added to the sum total of his power. He may know how to solve a problem in geometry, but the knowledge of the solution of that problem may not have added anything to his personal power, unless he has sufficient blood to sustain the brain which he is using while he is trying to discipline it by means of these lessons.

The effect of muscular action upon the arterial system should also be considered. The heart cannot do all the work of carrying the blood through the system. It is assisted by the action of the arteries, and they are prompted to a healthy activity by the effect of the muscles on them—the muscles while in exercise. You can convince yourself of this by opening and shutting your hand vigorously. You see how red the inside of the hand becomes. The motion has assisted the arteries. We hear this question often asked when a man is said to have died of apoplexy, Was he fleshy? We hear the same question when a man is said to have died of heart difficulty, Was he stout? As though a man were more likely to have heart disease when he is stout, or to have apoplexy if he is stout. That does not necessarily follow. If the man does not take proper physical exercise he may be likely to have these difficulties, especially in

the matter of the heart, provided too much exercise is put upon it, and it is not assisted by the arteries.

How can the arteries be assisted best? They can be assisted by any muscular exercise. Any form of muscular exercise is better than no form at all, but there may be some forms that are better than others, so far as assisting the arteries to carry the blood through the system is concerned. I believe those motions the most helpful are at the same time the most beautiful. I am aware that I am altogether unorthodox in saying this, that a beautiful movement is the most helpful one. I believe that a curved movement assists more than one that is made in an angular manner or one in a straight line. There seems to be a prevalent belief that the uglier the exercise, the more beneficial it is. That aspect reminds me of what a man said to me once in an audience. He called my attention to some one who was present, and said, "There is a good man." "How do you know?" I said, "are you acquainted with him?" "No," he replied, "but he is so ugly he must be good." It seems to me as if this notion prevailed in matters of physical culture. It is sometimes so ugly that it must be good. Why can a movement not be beautiful and helpful at the same time? If any one can find a physiological reason for it, I wish he would bring it forward. To my understanding every physiological reason is against it. The movements of the Greeks were beautiful, and no other nation ever cultivated the physique as they did. Other things being equal, the slower the movement, the greater the result. Notice the feeble man. If he is compelled to make a movement he does it with a jerk. He cannot raise his arm slowly and steadily at the same time. There is a jerk in his walk. These jerks indicate his weakness. If you see a man full of jerks physically, you always believe there is something physically weak in the man. Jerks, then, are a sign of weakness.

The matter of music has been brought up. I believe that movements regulated by music are more beneficial than those that are not. Music is natural to man; music acts on the nervous system in a strange and mysterious way. Our movements are dependent on the nervous force. Without that stimulant, no voluntary movement could take place.

Again, moderation should be observed in the beginning and closing of exercises. Begin slowly. Use your utmost power at the middle of your exercises, then let the latter part be less strong. Never start suddenly in physical exercise. What is the record in regard to animals? How many horses have fallen dead when suddenly started from a walk. Again, how many have fallen dead when suddenly stopped at the height of speed. It is the same with men. About two years ago a gentleman ran to catch a train. He caught the train, stopped, and dropped dead. It was not the running that killed him; it was not the vigor of the exercise; it was the sudden stopping that killed him. Men who have the care of horses understand that truth. They will not allow a horse to stop suddenly that has been at the top of his speed. You will see that all of my exercises are gentle. In about the middle all the strength is put forth, and at the end it is lessened. The effort is so hidden that superficial observation will reveal only that a person is, for instance, lifting the arm. But if any one thinks there is no strength used because the person is not lifting a heavy weight, I should like to have him try it. *Slowness, precision, and definite aim* are the three directions that I give for exercises.

Again, we should secure and maintain certain obedience. I believe most thoroughly that, in addition, we want a certain sense of freedom. While you are putting forth your utmost strength, you want, at the same time, a sense of freedom. If you feel restrained, there is something wrong. You are not putting your manhood into it. In order to obtain that sense of freedom, it is necessary that some portions of the body be free and unrestrained. The muscles bear a certain relation to each other. If I raise my arm, the muscles are so arranged between the shoulder and the neck, that they pull on the muscles of the neck. If I hold the neck rigid, I have given undue exercise to those muscles, exercise that a child would never use at its play. In nearly all of our muscular exercises that are taught there seems to appear a lack of knowledge on this subject of the relation which the muscles sustain to each other. If I carry my hand forward, there is a motion of the shoulder. There should be maintained the utmost economy possible. The object is not to

see how much exercise you can get out of a boy ; it is to get accurate, exact, and physiological exercise. The reflex action of the muscular sense should be considered. If you have developed muscular sense, there is a certain reflex action through other muscles. I would like to have that provided for.

Physical culture should continue through life. You cannot lay up a storehouse of health during five years of exercise to draw on for the next fifty years. You want to develop yourself in a system of physical exercise that you can repeat every day as long as you live, no matter where you are or how situated. It is the continuance of exercise that gives it value. You may take special exercise to bring up a greater degree of power for some special occasion. But the highest good in physical culture comes from continuance therein. I have noticed that some who have studied in gymnasiums have become fine, strong men. What has made them so? They did not develop themselves in a day or a year. But you say you are going out into the world, and you cannot carry a gymnasium with you. You cannot carry all the apparatus necessary. Can you do nothing to remedy that difficulty? You cannot carry dumb-bells, rings, clubs, parallel bars, and all the things you find in a well-furnished gymnasium. I am not antagonizing these things. I know that I have been reported again and again as doing so. And it may seem to some that I am absolutely antagonizing the use of apparatus. I do not ; I simply antagonize this idea, that they should take the place of what may be termed free gymnastics. Many kinds are right in this way. They are doing good in their place and time, a great deal of good, but we cannot always have them. You want something you can take with you. So if you are teaching physical culture, be sure that if you do not teach anything else, you so teach a man that he can carry himself well, that he can know how to use his arms. Teach first such exercises as are necessary to his health, rather than try to make a Hercules of him. Whatever you choose to add after that for specific reasons, very well and good. There are some who will not take exercise unless they can have a machine. Give such people machines then. Some boys will not take hold without dumb-bells and Indian clubs. Give them

those things. Give them exercise in some way, for they must have it.

Dr. SARGENT. — In the interest of physical education, and in the interest of truth, as I see many teachers here who are going out to promulgate these ideas, I should like to ask Dr. Emerson to name the physiology from which he has extracted the principles he has enunciated this morning.

Dr. EMERSON. — Give me time, and I will do so.

The CHAIRMAN. — There will be time this afternoon.

Adjourned.

Fourth Session.

SATURDAY, December 3.

The Conference met at 3 P.M., Dr. Harris in the chair, who announced that general business was in order.

Mr. Ray Greene Huling offered the following resolution :—

Resolved, That a Committee of eleven be appointed to take into consideration the best means of presenting in the common schools the method or methods of physical education ; this Committee to be appointed either by the chair or by the audience, as shall be thought best.

The motion was seconded by Mr. E. P. Seaver, Superintendent of Schools, Boston, who spoke as follows :—

If you will allow me, I will say two or three words in seconding that motion. I wanted to get an opportunity this morning to support the suggestion which was then made, and which has now been presented in the form of a motion. As to the composition of the Committee, it seems to me that a word or two might be said. Of course, the need of such a Committee is apparent. It does not need illustration. We have heard a good deal during these two days ; much of wisdom has been shot into the air. We want some process by which it can be concentrated, brought to a focus, brought to a practical issue. We need the physicians, from whom we have heard a good deal. We need, too, the masters in physical training, from whom we have heard a good deal, and very interestingly too. There is another class from whom we have heard very little during this Convention, and who ought to be represented on a Committee of the kind proposed. I refer to the school teachers. It is possible that if a part of the time had been set aside for them, some of the conditions of the problem before us would have

been more clearly stated than they have been stated up to this point. The limitations under which we must work need to be fully appreciated before the principles of which we have heard can be usefully and effectually applied. We need to get an accurate, clear knowledge of the situation, and I know of no class of persons in the community better prepared to state accurately what the situation is than the school teachers themselves. I might illustrate this possibly, by instancing some of the remarks which have fallen, and which might be carried away by members of the Convention as representing accurately the state of things. I will illustrate by referring to one amongst a dozen. One speaker told us, for example, this forenoon, that we in Massachusetts — I am saying this for the benefit of those who come from the West — take the children from the control of their parents by force of law, and shut them up in the school-rooms, and keep them in cramped and strained positions for five hours a day. The literal fact is that nothing of the kind is done. *I* understand what the gentleman desired to say to our visitors from other parts of the country and from abroad. The remark was not probably intended to accurately represent the state of facts. It was intended — and those of us who know General Walker know what his intention was — as an innocent rhetorical device, a picturesque exaggeration, used for the purpose of making a proper impression; and when the object of discussion is to stir up thought, set the pot boiling, why, froth of that kind comes to the surface. The office of a Committee of this kind will be to skim off a good deal of this froth, and find what the clear liquid facts are. I am not going to say what goes on in Boston schools. There are many of us in the audience who could illustrate the facts, and testify to them, if it were desired. It is, however, a fact that we are devoting a portion of the five hours to physical exercise of some sort.

It has been said, again, that but ten or twelve minutes can be given to this work. It is easy to smash the course of study, and double the time, if necessary. What we want is the best possible course of exercise on which to employ that time. And the problem has complications from this side which have not

been presented. Again, as to limitation of space. A good many of these exercises must be done between desks, in spaces eighteen inches square, or they will not be done at all. We have school basements and we have school halls, and we have lately put some of these spaces to good use. Rather more time and effort have been spent upon this subject for a year and a half or two years past than was spent twelve years ago. But we are not satisfied. We want more light. We want something that will work under the conditions which exist, and accurate knowledge of these conditions must be communicated to this Committee of eleven which is proposed; and, therefore, I hope that the proposition itself will be carried out, and that in this Committee will be an adequate representation of the school teachers who are engaged in the practical work of carrying out these theories. I second the motion.

It was moved as an amendment that three of the Committee should be grammar-school teachers.

Mr. Huling said that he saw no reason for distinguishing between the grammar and the other grades, which would make it wise to place any restriction on the character of the teacher taken.

The amendment was not seconded, and Mr. Huling's motion as originally put was unanimously passed. On further motion it was

Voted, That the Committee should be appointed by the chair before the close of the session.

A paper on "The Pedagogic Phase of Physical Training," by Hamilton D. Wey, M.D., of New York State Reformatory of Elmira, was read.

THE PEDAGOGIC PHASE OF PHYSICAL TRAINING.

BY HAMILTON D. WEY, M.D.

PHYSICAL training and its collateral branches, comprised in the term athletics, is entered upon for the following purposes : 1, Diversion ; 2, Mere muscular increase ; 3, Pecuniary gain ; 4, Physical renovation and renewal ; 5, Mental quickening and strengthening.

The third object is foreign to my subject ; the first and second have an indirect bearing ; while the fourth and fifth are closely connected with and related to the pedagogic phase of physical training.

From the days of Plato to the present time the connection between a clean, clear mind and a fair body has been alluded to and dwelt upon, but empiricism has delayed a proper appreciation of the subject and the advent of the new gospel of physical training founded upon the principles of physiology.

History tells the tale of Greece and Rome attaining their respective supremacies through physical excellence ; and from resulting mental capabilities came their contributions to literature and art. The possession of power and acquisition of wealth induced a change in modes of living, luxury and dissipation replacing simplicity of habits and physical integrity, and national supremacy waned under the blight of individual decay induced by the gratification of sensual desires and appetites. The story of mental enfeeblement following physical deterioration is as old as man himself.

The fusion of mental and physical training in the compulsory educational system of Germany has been brought about during the last hundred years. To Guts-Muths, Jahn, and Spiess belongs the credit of the building up of German gymnastics.

All were teachers, and each one was, it is assumed, conscious of the physical deficiencies of his pupils.

Contemporary with them, Ling of Sweden, after a life of vicissitudes and excitement as a fatherless boy, theological student, tutor, naval volunteer, and fencing master, was instrumental in the founding of the Central Institute of Stockholm, of which he became the director in 1816. In addition to developing the Swedish movement cure he organized systems of popular and school gymnastics which bear his name at the present time.

In circular No. 5, of the Bureau of Education, Washington, "Physical Training in American Colleges and Universities," by Dr. E. M. Hartwell, it is stated that the Round Hill School, established in 1825, at Northampton, this state, was the first institution in this country to make gymnastics a part of the regular course of study and instruction. This was done by Dr. Charles Beck, who had been the pupil and friend of Jahn in Germany. The good effects of the Round Hill School were appreciable years after it had ceased to exist, for want of proper pecuniary support.

In 1856 Dr. George C. Shattuck of this city, a former Round Hill boy, founded St. Paul's School at Concord, N.H., a school where a lively and healthy interest has ever been taken in gymnastics and athletic sports. In his deed of gift Dr. Shattuck states: "The founder is desirous of endowing a school of the highest class for boys, in which they may obtain an education which shall fit them either for college or business; including thorough intellectual training in the various branches of learning; gymnastic and manly exercises adapted to preserve health and strengthen the physical condition; such æsthetic culture and accomplishments as shall tend to refine the manners and elevate the taste, together with careful moral and religious instruction."

Prior to 1860 the authorities of American colleges were indifferent to the necessity of a supervision over the physical well-being of their students, neither providing them with instruction in gymnastics nor facilities for athletic sports. The student attended college that he might absorb the greatest

amount of mental pabulum while there, or indulged in dissipation as the result of passing beyond the direct influences of home; unmindful in either case that the body had other claims to consideration than the avoidance of manifest disease.

Nor can more be said in this respect in favor of public and private schools prior to the time named, save in the case of the two institutions already noted.

Passing mention should be made of the efforts of Miss Catherine Beecher at Cincinnati in 1837, of which she says: "When physical education takes the proper place in our schools, young girls will be trained in the class-rooms to move head, hands, and arms gracefully; to sit, to stand, and to walk properly, and to pursue calisthenic exercises for physical development as a regular school duty as much as their studies; and these exercises, set to music, will be sought as the most agreeable of school duties;" of the heavy gymnastics of Dr. Winship, and the system of Dio Lewis; all of whom were enthusiasts in their work, and all alike lived to see their systems wax and wane.

Other individual systems have been devised that enjoyed a brief season of popularity and then passed away because their originators had no higher conception of physical training than exercise for the sake of exercise alone, and a means of providing an outlet for the escape of superfluous energy.

At the present time there are three principal methods of physical training in vogue, the so-called American, the German, and the Swedish, which I name in alphabetical order and without regard to preference. These severally or in composite form are employed in this country wherever the work of physical training in its highest sense is carried on.

A consideration of athletic sports does not strictly fall within the scope of this paper, as athletics constitutes a specialty in the field of physical training and bears much the same relation to it that ophthalmology and neurology do to the general practice of medicine. In order to be a scientific specialist it is necessary to first become a successful all-around practitioner. This applies to physical training and athletic sports as well as to medicine.

Physical training in the highest and broadest meaning of the

term is the cultivation of organic perfection of the human body, the correction of disparities, overcoming of defects congenital and acquired, strengthening of points of least resistance, and an approximation to the proportions of an ideal man.

This implies a conception of man, not as a dual being of body and mind; but as an unity into the scheme of whose organism enters the indisputable fact that for all mental action there is a corresponding physical basis, mind and body being the two halves of a perfect whole. Without matter there is no mind, and the absence of mind can be accounted for by change in structural components, as want of development, error of nutrition, degeneration of tissue, functional faults, and perverted action, all of which constitute studies in pathology and psychology.

A proper study and appreciation of the physiology of exercise, together with a recognition of the fact that "education cannot create anything new, it can only develop and unfold the already existing faculties of the human mind," furnishes an understanding of the manner in which the bringing to the highest degree of organic perfection the human body and the overcoming of structural weakness, disparities, and deformities, reacts upon the mental faculties, increasing the activity and receptivity of the brain and nervous system.

There is no greater educational fallacy than the idea that the brain is educated at the expense of muscle, and muscle at the expense of brain, that excellence in both cannot be attained simultaneously.

The body deteriorates under exclusive mental cultivation, because it is sacrificed through neglect and inertia, and proper hygienic conditions lost sight of and ignored. It deteriorates because the laws of physiology are unheeded and transgressed.

The essential principles of physical training comprise more than is included in mere muscular increase,—structural amplification.

Developing apparatus for structural increase; free-hand exercises to promote muscular co-ordination and extend the scope of action, together with consequent stimulation of the special senses, as sight and hearing; massage, whereby the peripheral

nerves are impressed, which in turn react upon their special centres situated within the central nervous system; the bath as an aid to elimination,—all these when properly supervised and systemized resolve themselves into a dynamic agent appreciably influencing the functions of the brain and nervous system.

In appreciation of the fact that exclusive mental cultivation tends to bodily enfeeblement and degeneration, most of the institutions of higher learning in this country have provided for their students gymnasia equipped with all needful apparatus, and in charge of men, usually graduates in medicine, who are competent to recognize the physical deficiencies of undergraduates and apply the proper measures of relief. As an estimate of the importance attaching to physical training, it is only necessary to mention that at the present time the directors of college gymnasia are physicians, and not, as formerly, retired and broken-down athletes or adventurers.

Of what advantage is a liberal education if secured during college life at the cost of the contraction of affections peculiar to sedentary life, and which later, when a professional career with attendant anxieties and exactions or a business life with its cares and responsibilities is entered upon, declare themselves in nerve tire and nervous exhaustion? Instances are not wanting, though happily less common now than formerly, owing to improved methods in education, where ambition to excel and desire to reach an exalted plane either in college or subsequently, paved the way for a long train of neurotic symptoms indicative of a nervous system vitiated and weakened, the result of developing mental faculties at the expense and in the neglect of their bodily habitation, conditions favorable to the contraction of vices, as the opium and alcoholic habits. A healthy and social dunce is a more agreeable member of a household than an educated neurastheniac versed in the sciences and familiar with all languages past and present.

The time is fast approaching, if indeed it be not already here, when boarding-schools, colleges, and universities will by public sentiment be compelled to pay the same attention and consideration to the physical needs and necessities of those whose education they assume the charge and guidance of that they

do in the matter of mental culture. And the institution that allows a student to develop his mind at the expense of his body and the cost of mental warping will be regarded as having proved itself indifferent to its trust.

Physiological laws know neither sex nor condition, and what is applicable to the male applies more forcibly in the case of the female.

The present tendency of government is to assume paternal offices, and judging by the signs of the times, the season is approaching when public school boards and commissioners, in addition to an observance of the sanitary laws found in the book of statutes, will be compelled to take cognizance of physical needs and change their curriculum to include corporal development as well as mental unfolding. The time may be delayed somewhat by reluctance to introduce what is still regarded in many quarters as an educational innovation, and by the fact that parents grant the public school authorities less control over their children than when they intrust them to those in charge of boarding and preparatory schools. Encourage a boy to be manly and cultivate a love for boyish sports. Do not attempt to repress as coarse and a thing to be condemned the ebullition of his animal spirits. A boy-girl is to be preferred to a girl-boy.

A child brought up by those who have knowledge that it is in possession of a body that calls for exercise to influence aright its development that it may not be weakened by the demands made upon its economy during the growth period, is placed in a condition more favorable to the successful unfolding of its dormant and potential mentality than the child enervated by the undue care and coddling misdirected parental affection sometimes imposes.

And here it is proper I should make a distinction between physical care and physical training. Briefly, the former may be stated to be sufficient attention given the purely animal functions to insure their continuance, forethought in dress for protection against the elements, a regard for personal appearance in conformity with the usages of society, and observance of sanitary laws to the end that preventable disease may be

avoided. Physical training is the overcoming of disparities of members, correction of errors of nutrition with general systemic accretion and extension, brought about by physiological methods. Ignorance in the matter of the former with errors arising from artificial modes of living may cause a need and necessity for the application of the latter.

I would that I could portray with the same distinctness and power of definition by picture of pen, as I can recall it by mental imagery from object lessons furnished by my work in physical training, the reciprocity existing between the physical and mental state. As physical conditions have been improved, the volume and character of mental action have been increased; while conversely, with exclusive mental cultivation and corporal neglect, the physical man would maintain itself for a time until a certain degree of mental fulness had been attained, after which body and mind synchronously would decline, as if to emphasize the words of Scripture that much study is a weariness of the flesh.

I assume it to be in accord with the theory and principles of pedagogics that initial educational work should be under the direct supervision of a skilled and accomplished teacher, and not a novitiate who regards primary class work as but a stepping-stone to preferment.

The greater the mental and physical embarrassments under which a pupil labors, whether due to heredity or environment, the greater the necessity for skilled teachers to supervise the rudimentary processes of education, and lay the foundations deep and broad for a correct habitude of mind and body.

Many a child of tender age is sent to school not so much to hasten its education as to relieve an overburdened mother of a portion of her cares. An intelligent teacher can direct the play and sports of such an one that they become factors in body growth and contributors to mental breadth and depth.

It has been truthfully observed: "Training and education begin where previous functions and acquirements ceased. The beginning of the treatment of each child is where his natural progress stood still."

The fundamental principles of a true system of education appear in the aphorism of the elder Seguin already quoted:

"The beginning of the treatment of each child is where his natural progress stood still," be the same in corporal or mental lines, or both combined.

In the education of defective classes, the dependent represented by the idiot and feeble-minded child, together with those out of adjustment with society, as the stunted dullard and illiterate youthful criminal, the child deficient in moral sense and disposed to criminality, prevailing educational measures as exemplified in ordinary class-room teaching are disappointing because they are not sufficiently far-reaching and penetrative. It is as reasonable to assume that the earth will bring forth her increase for the use of man without a proper previous preparation of the soil as that these defectives can be raised to a degree of healthy mental action by efforts directed solely to the mental half and the exclusion of improvement of the tissues composing the physical.

It is nearly a quarter of a century since Dr. Edward Seguin gave to the world his classic work on "Idiocy," approaching which nothing has since appeared. It discusses the moral treatment, hygiene, and education of the idiot, and presents a full and clear exposition of the physiological method of education in the treatment of this class of deficient which is the "adaptation of principles of physiology, through physiological means and instruments, to the development of the dynamic, perceptive, reflective, and spontaneous functions of youth."

At the Twelfth Annual Conference of Charities, at Washington, in 1885, there was not a listener not moved nor scarcely an eye undimmed as James B. Richards related in plain and simple language the story of Sylvanus. Briefly and in the language of Mr. Richards: Sylvanus was eight and a half years old. He had never known his mother, and a smile had never been seen upon his face. His father had tried to send a light from some shining object into his eyes, but he never blinked but once. He had not the power of locomotion; his lower limbs were paralyzed. Not even the sense of pain or the sense of touch did he have. This boy I found dressed in a red flannel gown, lying upon the floor. He could not even roll over; he could do nothing.

I took the boy with me with the greatest care to the institution, and dealt with him as with a babe. He was held in arms, fed, rubbed, manipulated, worked upon to see if we could arouse the energy of his body. He was properly bathed and exercised, and everything done to develop him. After a month's careful study of his case, I made up my mind I must get down to him. Where did I get my lesson? I observed one day how a mother, a bright, intelligent woman, managed her child. She was upon the second floor; and her boy, who was on the lower floor, disobeyed her. She did not scream to him from the top of the second flight of stairs, saying, "Jack, you must not do that." She came down stairs, both flights, and getting right down to him on the same level with him, eye to eye, she said, "My dear boy, don't you know that that is wrong?" The boy melted and threw his arms around his mother's neck. That is where I got my lesson. Get upon the floor,—get down where the child is, right down there. If he knows anything, it is down there. You must take hold of the slightest things in your favor. Day after day, for an hour at a time, for three months, I took a book and read aloud to that boy,—intelligently, as if he understood every word I said, adapting the intonations as if I were reading to an intelligent person. . . . He finally heard this voice that was ringing around him in a musical tone month after month; and one day, when I came and simply sat in a chair and read to myself, I looked on one side to see if he missed me, and the child actually appeared uneasy. Imagining that he missed me, I lay down on the floor beside him as usual, saying: "Oh, you want me, Sylvanus? Well, I am here." He breathed a soft "ah!" I had planted the first want. He wanted me, and he wanted me there. He had felt my influence there; I was too far off in the chair. So I read to him two or three months more. Then, instead of reading aloud, I read to myself one day. After a long time, I saw he was trying to do something. I watched him. Gradually, he lifted his finger and laid it on my lips. "Oh, you want me to read to you, do you?" And so I read. Another want had been implanted. I read to him every day, letting him always have the privilege of opening my lips. At last he smiled,—

the first smile of recognition that ever came to the child's features. It was enough to pay me ten thousand times over for all I had done. . . . This boy, step by step, went on. Finally, I could take him up and have him where I pleased. He was near me; we were one. He felt it and knew it. He was glad to be taken up. This training went on till one day I found he could move his limbs. I put him on his hands and knees, to teach him to creep. This was nearly a year and a half after he came to the institution. As I placed him there, I said, "I wonder if I can help him to talk." He had not talked any. I said to him: "Now move this hand: that is right. Now the other: that is a good boy. Now move this leg: that is right. Now the other: that is a good boy," guiding them as I spoke. I did this every day for months, till finally I found he was trying to do it himself between the drills. A while afterward I thought I saw his lips moving as he did it. Putting down my ear very close, I found he was talking. He was whispering to himself: "Move this hand: that is right. Now the other: that is a good boy. Now move this leg: that is right. Now the other: that is a good boy." He had heard me talk in such a way that it had aroused him to talk.

And so pupil and teacher went on. Object lessons were taken up and followed out until a connection was established in the expanding mind of the former. The teacher's reward was when the mother came to see her son. Entering the room, she looked about and said, "Where is Sylvanus?" When he heard his name, he answered: "Here I am; is that my mother? Oh, mother, I am so glad to see you."

The efforts of Dr. Seguin in the physiological training of an idiot hand and eye; and the faithfulness and patience of Mr. Richards in rescuing Sylvanus from his state of mental blank and physical incapacity, are applications of physical training with crowning results in those cases where absence of conscious wants constitutes the greatest helplessness and deficiency.

I shall not be guilty of digression in alluding to a paper bearing the title, "Physical Training of the Insane," read at Newport, in June last, by Dr. Walter Channing. Dr. Channing says: "With the insane, of course, the results have been more

varied and uncertain, but on the whole they have been gratifying directly and collaterally. There can be no doubt nutrition has been improved in a number of cases, but the especially perceptible result, which is more marked as time goes on, is the generally improved physical and moral tone, both among patients and employés. There is less susceptibility to trifles, more freedom of motion, more independence of action, more appreciation among all of the value of exercise and care of the body, and more co-operation in the general treatment. . . . I feel that I am as yet not beyond the elementary stage of physical training of the insane by means of gymnastics, but the results are certainly favorable enough to encourage me to persevere. I can say from my personal experience, that there is much more in such work than I had ever imagined. This confidence is, of course, of great assistance in carrying out the details of what might be called, 'gymnastic treatment,' for I cannot help having some enthusiasm for a plan of treatment which has been of such benefit to sane subjects, as well as to the nervous and insane."

The application of physical training for the amelioration of certain nervous and mental conditions is not an idea of recent introduction; but like many other therapeutic measures, when first proposed, failing to meet with general favor, it was relegated to the background till time and circumstances should be more favorable to its acceptance as a means of treatment.

A modicum of attention bestowed upon the bodies of children, inmates of orphan asylums, refuges, and correctional institutions, in addition to the routine life of such, as the providing for vital necessities, food and raiment, medicine for sickness, work in shops to dispose of accumulated and accumulating energy, school-room instruction, and a short occasional outing in the open air that the wind may whistle around the person and remove the odors, would evolve a better type of humanity with increased receptive power of mind and morals.

A little more than three years ago the work of physical training as a pedagogic measure was entered upon at the New York State Reformatory, at Elmira.

This departure in the treatment of youthful criminals was brought about through a recognition, based upon years of obser-

vation, of the futility of attempting to treat primarily, by mental and moral means, certain delinquents who had demonstrated by their acts their unfitness and inability to maintain themselves in harmony with society.

This class is represented by the poorly nourished boy of the overcrowded tenement house; the homeless wanderer about the streets and docks who, by daily association and participation, becomes familiar with crime in its various phases until a life of criminality resolves itself into his normal state by reason of his knowing no purer atmosphere; the boy rich in conceit and poor in experience, who goes astray attempting to demonstrate his parents' ignorance of the world when they urged upon him the avoidance of certain so-called pleasures; and the overgrown and stupid dunce found in every rural district, a neglected yokel barely able to read and write, without resources within himself, and corroded by the tales of lewdness and crime told nightly at the cross-roads store to the accompaniment of

"The loud laugh that spoke the vacant mind."

Such as these the teacher in the school-room failed to reach. They would sit and listen and forget, if indeed they ever comprehended, or in mind revert to acts and scenes connected with their former lives.

An experimental class of twelve was formed. We took them in hand, regulated their diet as to quantity and kind, washed and massaged them, and put them daily through free-hand exercises. It was a laborious task to teach them precision and rapidity of action in their exercises, but perseverance demonstrated their susceptibility and responsiveness to this mode of stimulation.

The class was continued for five months, when the men were returned to the conditions of prison life they were formerly unable to conform to. For the succeeding five months they were carefully watched and noted to see if the improved physical state and resulting increased cerebral power would prove ephemeral and subside upon withdrawal of the stimulation that produced it, or, continuing, be the beginning of a state freed from former embarrassments.

The latter was the case, as generally they maintained themselves in the performance of their requirements, which previously they could not do, in the threefold lines of behavior, school, and labor, averaging collectively seventy-one per cent as against forty-six per cent for the five months preceding their being taken in hand.

From this beginning the work of physical training has gone on, until now the physical training class has come to be a school preparatory to those of letters and the trades for the unformed and crude boy, the weak in body, and feeble in mind.

The experience gained has taught the lesson that those whose mental and moral powers rest upon a badly constructed and faulty physical base cannot be reached by attempts made primarily to lift the mental and moral man above the embarrassing and hampering physical conditions that found expression in wrongdoing of head and hand, as criminality, but rather by bringing the physical habitation of the mind to the fulness of its perfection, that the subtle connection between the cerebral cells, motor and sensory, may be direct and to the line, not hesitating and devious, with resultant evil.

A hundred and sixty-four boys and young men, ranging from sixteen to twenty-nine years of age, comprising epileptics, a few not far removed from feeble-mindedness, together with instances of physical, mental, and moral perversion, have been selected during the time the work has been in progress, that by an improvement in tissue and harmonizing of the various members of the body increased cerebation may be brought about, and a power established to distinguish between right and wrong.

The work of physical training, that the perfection of the scheme may be attained, is a trian one, comprising muscular exercises that structural amplification and harmony may be obtained, the bath and massage for organic excellence and adaptability to the requirements of the hour, and diet, that the subject may be fed, not filled, a proper nutrition producing the desired force that these severally may be brought about.

This triality being well carried out, the physical and mental parts of man will fall into alignment, and there will have been

an education of the activity, the intelligence, and the will, three functions of the unit man.

Monsieur Pierre de Coubertin, secretary of the French Educational Reform Association, was invited to address the Conference.

M. DE COUBERTIN. — Mr. President, Ladies, and Gentlemen : I thank you for the hearty welcome you have given me by your applause ; I do not take it as granted to my unknown self, but to my country, your sister republic.

Dr. Harris kindly said that you would be interested in what I should have to tell you. I do not agree with him ; and I firmly believe that the result of my boldness in answering the call will be to give you rather a poor idea of the way we Frenchmen speak English. It may also give you an unfair idea of the way we fulfil our duties. Being commissioned by the French Government to visit the universities and colleges of this country, not only with reference to the subject of physical training, but with reference to other branches, my duty is to present my report previous to any public statement on the subject. But I understand, from inquiries I have made, that the French Minister of Public Instruction is not here to-day, and I trust you will be kind enough not to let him know what I have been doing in Boston !

I was asked the other day what, in my opinion, American education was like. I answered that in some respects it looked like a battle-field where English and German ideas were fighting. While I fully acknowledge that from the physical point of view nothing can be said against the German system, I believe, on the other hand, that from the moral and social point of view no system, if so it can be called, stands higher than the English athletic sport system as understood and explained by the greatest of modern teachers, Thomas Arnold of Rugby. His principles are the ones on which was founded last year the French Educational Reform Association. I wish I could give you a detailed account of the work our Association is engaged in carrying out ; it is no less than a general reform of secondary education. We leave aside the primary school question which

our government has lately settled, as I believe, in the best way. In such schools a systematic course of physical training is needed, and the experiments that have been tried in France have proved so successful that there is no reason why we should try anything else. The German methods have now only to be developed in all our primary schools and made the general rule. We also leave aside higher education, for the simple reason that if we want to have well-trained men, who will enjoy manly games and sports, the best and quickest way to realize that wish is to train the boys who are to become the men, and to develop among them a strong taste for manly games.

We believe that the most important period in a boy's education is the one extending from his twelfth to his nineteenth year. During that period not only his brain, not only his body, but above all his *will* can be trained. His qualities as a citizen depend almost entirely on the lessons he receives at that early time of his life. I must state what kind of a citizen we need in France; I do not know that our ideal type is the same as yours, though I am inclined to think that the difference is not very great. We want free-minded, self-governing men, who will not look upon the State as a baby looks on its mother; who will not be afraid of having to make their own way through life. Such is the work that our Association has pointed out to French teachers as being the most important part of their duty. It involves practically what I should call the training for freedom.

Now, where is the ground on which such a training can take place? What is the freedom which a boy of fifteen can enjoy? Is it intellectual freedom? How can this be? I believe if a boy were left to his own impulses in that way, he would learn nothing at all. He would set aside Latin, Greek, history, and mathematics, and be content with reading novels on rainy days. Is it moral freedom? I need not say what would come of that. His play is the only part of his life where he can enjoy freedom. Let him have the management of his own games, and so you will turn out a man fitted for social life, that is, as long as you consider society as a gathering of free men; some do not, and it is quite natural that they should have another aim in education. We do, and this is our aim.

Now, can the English system of free athletic sports be carried on together with a systematic course of gymnastics? I believe that to a certain extent it can, so long as you do not make that course compulsory, and it does not interfere with the management of the athletic clubs and societies.

I must draw your attention once more to the fact that I am not speaking of the public schools nor of the universities. I need not say that I have been very much interested in what I have seen in this country, at Amherst, Harvard, Cornell, and other places. The work done there must be good. Its usefulness is proved by the fact that such men as Dr. Hitchcock of Amherst, Dr. Sargent of Harvard, and Dr. Hartwell of the Johns Hopkins believe in it and carry it out themselves. I am only speaking of the schools where boys from twelve to nineteen are taught. Such are our French lyceums, colleges in England, and some recently founded schools in this country, as, for instance, Groton School, Lawrenceville, the Berkeley, and others, where Arnold's precepts are followed. Any one who has read Stanley's "Life and Correspondence of Arnold," or that charming book "Tom Brown's School-days," knows what kind of good Arnold has done for his country. But I did not realize how great had been the change till last year when Mr. Gladstone told me about the state of things when he was himself an Eton boy, sixty-five years ago. The moral standard was then very low. The boys had sport, but they turned it into brutality; hazing, fagging, and mischief of all kinds went on every day. Masters and pupils looked on one another as strangers, if not as enemies. Then came Arnold; in five years' time Rugby was completely transformed, and the reform spread all through England. That was some fifty years ago; and if you study closely the political, social, and moral events in England for the last fifty years, you will find, as I did with no little bewilderment, that the change was sudden and general in politics as well as in society. I wish I could give you more details, — I am writing a book on the subject, — but the only thing I will say is, that the educational reform carried out by Arnold and his followers has been one of the most important events in the life of the English people, and that it prepared

the way for the bright period called the Victorian era, the chief characteristic being the wonderful influence of athletic sports on the moral and social qualities of boys.

In connection with the Exhibition we had this summer a great number of congresses in Paris, so many indeed that the "Figaro" proposed to give a prize to the man who should not be a member of any congress, if such a man could be found. Among others we had one on Education, of which I had the honor to be the secretary. Early in January we issued a circular and sent it to the head-masters of English colleges all over the world. Six thousand copies were sent, and we got a great many answers—from the Cape Colony, from Australia, from America, from English settlements in China, and from Canada,—to the following questions: What are the games played in your school or university? If there are local plays, give the chief rules. How many hours do the boys play? a day? a week? What about riding horseback, fencing, military drill, rowing? Are they allowed to form athletic associations? Have they debating societies? Do you believe in athletics improving companionship? morality? work? temper? I added that detailed accounts, books, pamphlets, and school reports and papers would be accepted with gratitude, and we got so many that we were obliged to open a library to put them in.

This inquiry has showed us that all over the world Englishmen, who perhaps knew very little about Arnold himself, were still holding to his views and ideas and believed them to be the best. A reform of the same kind we are now trying to introduce in France, according to the perhaps unchristian, but very practical principle: when you find your neighbor has something good, take it.

S. S. CURRY of the Boston School of Expression. — For one, my heart goes out in gratitude to the noble lady whose interest and benevolence have made it possible for us to come together and hear the principles of some of the methods of physical training presented and discussed. It is appropriate for me to say this, as the special phase of training which I represent is one that was omitted. I, however, understand that it was absolutely necessary to make a selection, and to leave out all training which

had relation to the voice, to development of grace, or for the purposes of expression.

As I was asked to participate in the discussion, I took it for granted that it was on account of my connection with vocal training and my study of the relation of physical training to the voice and the responsiveness of the body to emotion. I accordingly prepared some points which were the result of experience and study which might throw light upon physical training. But with the small amount of time remaining to the convention, I do not feel it right to give all three, and so will merely ask a few questions of these physical trainers, hoping that such questions may awaken thought, if not lead into a line of observation and investigation which so far has been overlooked.

I do not do this in a controversial spirit, but with a sincere endeavor to convey to you something as a small recompense for what I have received from you.

Dr. Hartwell, in the first paper before the convention, said that there were three actions which distinguished a man from an animal. One of these was those associated with the upright position, and another with the muscular actions in relation to the voice. If this be true, how comes it that you as physical trainers so completely overlook the voice in its connection with the body, and consider vocal training so entirely distinct from physical training?

Again, I wish to ask why it is that our leading vocal trainers keep their pupils, if possible, away from the gymnasium? It is their experience, as many have told me, as it certainly has been mine, that much of the work in the gymnasium injures the voice. Is there not something wrong, and have you carefully considered what the mistake is? Would you be willing that I should explain my understanding of the difficulty? As I look into the faces of physical trainers from all over this country, I feel that this is an important question.

I rejoice with you in all that you have done. A vast number of discoveries have been made in relation to physical training in the last few years, which do great honor to the investigators. To my own personal knowledge—and I have heard the same stated by others—the moral atmosphere about Harvard has

been greatly improved during the past five years. Men do not, to the same degree, drink and smoke and engage in many things which were formerly very common. They say athletes must not do so. These things lower the tone of the system and hinder development, and I earnestly hope that you will go on in your investigations; but, in your deep researches in physiology, do not forget that there are other ways of looking at man. The Greeks did not possess the remarkable knowledge regarding physiology that you have, but they studied a man artistically, and accomplished results which have never since been rivalled. There are other forms of harmony which are greater and deeper than muscular proportion. Muscles may seemingly be in exact proportion to each other, and yet there may be some vital part in the depths of the body which may be weak, and it is the weak part which needs attention.

Now if I could have time, I might unfold a great many points where the ordinary gymnastics injure the voice. I once taught a young actor, whose throat was sore when he came to me, and his breathing abnormal. I did my best to restore the normal relationship, but he seemed to get no better. One day he asked me if I thought the gymnasium tended to hinder his voice and upset his breathing. I asked him what he did. I carefully went over with him the programme of exercises which he practised. All was clear to me. I did not advise him to leave the gymnasium, because I have ever felt that if gymnastics were properly practised they would be a great aid to the voice. I went over all his exercises and explained to him how to practise them. His voice began to improve at once; everything was restored. He insisted, in a few days, on leaving the gymnasium; but if he could have practised in accordance with the principles I gave him, and would have obeyed instructions, it would have been unnecessary.

One cause of the abnormal effect of the gymnasium is that the man is caused, in some exercises especially as ordinarily practised, to acquire a labored method of breathing. In fact, Maclaren justifies this, and says that one of the benefits of the gymnasium is that it introduces the muscles usually connected with labored breathing, and causes the man to use them regu-

larly. This is absolutely disastrous, if not ruinous, to the voice.

Of course every gymnastic exercise is an exaggeration, and it must be an exaggeration along the line of nature's normal intention. An exaggeration that perverts or displaces nature will be degrading in its tendency. The fundamental aim of all gymnastics, as is shown by Ling, must be to extend and develop the breathing; but this must not be forced, must not be hastened or strained, but the growth of the breathing must be gradual and along the line of nature's normal intention.

Again, why do so many of our physical trainers, if not all, give such exercises as constrict and stiffen the hips. Several exercises which have been shown upon this platform during this convention have had this tendency. Now if you will observe nature all around you, you will see that every man has an apparent centre, about which all parts of the body move. His limbs seem to radiate about the apparent centre. Compare the awkward man with the man who moves gracefully. You will find the awkward man, if he centres himself anywhere, centres all his actions in his hip, while the graceful man centres, so to speak, his activities more at the centre of the upper part of his chest.

Why is the axial line of the body forgotten? Sir William Turner, Professor of Physiology in Edinburgh University, says that the axial line runs from the summit to the base of the spinal column, and that this is his fundamental anatomical peculiarity as distinguished from an animal; that the curvatures of the spine, in relation to this axial line, are increased in disease, and made abnormal in many aspects. Why is this line forgotten in physical training? I can take any of your exercises and not destroy this axial line of the spine, but can so use the exercise as to establish its summit where it should be established, and enable a man to stand in stable equilibrium rather than in unstable equilibrium. You know it is a simple principle of physics that if a body is supported below the centre of gravity it is in unstable equilibrium, but if supported above the centre of gravity it has stable equilibrium. A large number of the men we see upon the street walk in unstable equilibrium. When we find a man standing in stable equilibrium, with the activities of

his body around the centre of his chest, we find ease, and grace, and repose. Will not you physical trainers make some observation upon these points?

Our Commissioner of Education, the chairman of this meeting, has defined education in his commentary upon Rosenkranz's "Philosophy of Education," as *the actualization of the ideal*. If physical training is a part of education, it must be the actualization of the ideal physical man through exercises. Consciously or unconsciously in the mind of every physical trainer there is an ideal man, and every physical trainer, as he examines a man, penetrates into his needs, and not only has this general ideal, but from specific insight into nature's intention regarding the particular man before him, forms an individual ideal. You doctors know the difficulty in making a pathological diagnosis, but a diagnosis for physical training is in some respects more difficult. For the trainer has not only to see what the man is, but what he may become, and prescribe such exercises as will enable him to become what nature intended him to be. This proves clearly that the physical trainer must be an educated man. Special development and training are very essential. He must not be narrow, must have no hobby but the broadest conception of his subject and the deepest intuitive insight into the needs of men.

Dr. Hartwell, in the opening paper, indicated a very great advance in showing that training must have respect to the nerves as well as the muscles. His criticism of the definition of exercise as muscular movement, by Maclaren, was well taken. But why did he not bring out the other side? Movements do not necessarily evolve a man. They may degrade him by a process known in science as devolution. And if physical exercises tend to establish a centre in the hip, so that all the man's radiation seems to take place from this point, the man is degraded, and not ennobled. But you say that in physical training man must be centred everywhere. There is a sense in which this is true; but if the centralization of the man is in different parts not related to the one great centre corresponding with the centre of gravity of the man, the unity of his organism is more or less destroyed, chaos is introduced among

his parts, and all grace and ease, and strength as well, will be destroyed.

Notwithstanding the advances made, have any of you at this Conference received any suggestions as to the power of an exercise to elevate a man or to degrade him? Have you had any principle even hinted that can enable you to better make your diagnosis and apply prescribed exercises so as to elevate a man in the scale of manhood, and not degrade him into an animal?

It is fifty years last May since the death of Ling, and we do well to-day to do him honor. Dr. Richter, the great physician of Hanover, said "his principles are incontestable," while a leading French authority says "if he was not the creator of the modern, scientific gymnasium; he was its regenerator." But the greatness of Ling was his principles rather than his mere methods or so-called system. Fifteen or twenty of these principles, which I gathered many years ago in an imperfect form, have been to me guiding stars in all my work of training. They have been so broad and so deep that I have realized their truth in every phase of training, and I gladly pay tribute to all he has done for me.

The following paper was then read :—

MILITARY DRILL.

BY HOBART MOORE,
OF THE BOSTON PUBLIC SCHOOLS.

MILITARY drill as a system of physical exercise has been in use in the high schools of Boston for a period of over twenty-five years. During this long test of its value many discussions have arisen, and a mass of testimony has been received from physicians and others acknowledging the physical and moral benefits derived from this system of physical training. When first introduced into the public schools, the pupils were few in number ; to-day over fifteen hundred boys receive instruction in this department of the school work. The application of the rudiments of military science for so long a time has resulted in adapting it to the requirements of the scholar until it has become an established organization comprising all the boys in the high schools of the city. While the tactics and discipline of the army of the United States are very closely followed, modifications have been found necessary to make the drill conformable to the size and age of the pupils. On the other hand, the movements prescribed by the authority on military tactics have been somewhat extended in order to make a more perfect system of physical exercise. Movements in the manual of arms have been added to equalize the exercise of the muscles on both sides of the body, so that as now taught the movement of the piece from one position to another affords a great variety of exercise, and particularly brings into action the muscles of the arms and chest.

The scholar executes his movements by words of command, his instructor being enabled thereby to control him, give him the requisite amount of exercise, and prevent over-exertion.

He is taught the position of the soldier which he must assume at the completion of every movement.

The balance step, while furnishing a light form of exercise, insures to him a proper motion and regularity in the use of the muscles of the leg. He is now prepared to march. The number of steps he is to take per minute is carefully prescribed; and soon becoming accustomed to this regularity and precision, he acquires the habit of walking with a dignity, steadiness, and soldierly bearing not apparent in those who have never had this or similar training.

In the double-time movement he obtains more violent exercise, and if he follows the instructions given him about breathing, he develops a healthy expansion of the lungs, and soon accustoms himself to execute this movement for a long time with little fatigue.

The exercises termed the "Setting-up Exercise," the first to which the scholar is introduced on his entry into training, is one of the most valuable parts of the whole system, and has been in use in the schools ever since it was introduced into the regular army. It is admitted by all to be one of the most efficient of the various forms of light exercise, and is used by the pupils at every drill. In the hall of the English High and Latin Schools of this city these and various other elements of the drill are given with excellent results to four hundred boys at one time.

Having exercised in all these different movements, the scholars are formed into companies and instructed in executing manoeuvres and the manual of arms in rapid succession. The use of the musket gives flexibility, firmness, muscular strength, and an erect position of the body. The company movements cultivate precision and freedom of motion.

This combination of movements has been found by long experience to be a most valuable form of exercise for pupils of the age of those attending our high schools.

Parents who have had boys previously instructed in the drill have often requested that their younger sons be allowed the privilege of attending this exercise. The novelty of becoming a soldier is very attractive to the average school boy. So

anxious has he been to enter upon the course of drill that the school committee were obliged to limit the age at which he may be admitted.

I speak of this to show that one of the most valuable features of this system of instruction is found in the fact that the scholar enters into these exercises with a real interest, a lively imagination, and an entire forgetfulness while performing his military duties, that the main purpose of his actions is to develop his physique.

The drudgery of simple exercises thus covered up with the enthusiastic spirit of a soldier gives to the scholar the best physical exercise he could obtain; namely, that acquired in a pleasant and unconscious frame of mind.

It is quite common to speak of the exercise as a means of physical training merely. The fact is overlooked, or little thought of, that it furnishes a moral culture of scarcely less value than the bodily exercise it affords. It helps materially in training boys to habits of obedience, obedience which is prompt, which is unquestioned, and which boys feel to be manly. It has been truly said "that the American boy runs no risk of being overtrained in this direction." It has proved efficacious in producing orderly habits and is a most important aid in the discipline of the school. This is the universal testimony of teachers in the schools in which the drill is a part of the curriculum. It develops a more manly spirit in the boy, invigorates his intellect, both directly and indirectly, makes him more graceful and gentlemanly in his bearing, and fits him for the primary duties of life, — those of a good citizen.

The physical condition of boys entering upon military instruction has been carefully observed, and it conclusively shows that they never have had a proper course of physical exercise during the time they have spent in the lower grades of our schools.

Accustomed as they have been to close confinement to their desks and school-rooms, many of them arrive at the high schools with the right shoulder lower than the left and with a tendency to be round-shouldered. They are so slow and stiff in the use of the muscles that they are unable at first to perform in a satis-

factory manner the simplest forms of the setting-up exercises. This condition of the boys is partly accounted for when it is considered that the seats occupied by them are a constantly acting cause of curvature of the spine or other deformity. In some German cities the setting-up exercise is used as a curative measure in the treatment of spinal and other deformities.

My long observation of the physical condition of scholars about to enter the course of military drill convinces me that there should be some thorough and efficient system of physical culture based upon the elementary principles of military training, commencing with the lightest forms of the exercise in the primary schools and progressing through the grammar schools, and so training the muscles of the scholar as to counteract the tendencies toward deformity continually surrounding him. In this way he would be better prepared, when he enters the high school, for the more extensive training of military drill.

Whatever may be the different movements prescribed for the lower-grade schools, they should in every instance be executed by words of command, so that the actions of the scholar will be continually within the control of the instructor.

The execution by command enables him to think quickly and directs his thoughts to the movement rather than to the exercise.

A system of physical culture should not be adopted simply for boys. The girls are in greater need of exercise, and should be equally considered in a discussion of this subject.

In the primary and grammar schools the setting-up and other light forms of exercise would be the same for girls as boys. The training of girls in our high schools in the more extensive instruction of military drill, so far as that system is applicable to them, has been very successfully tested in one of those schools.

In so short a paper I have been able only to touch upon some of the more noticeable features of the drill and to suggest that a system having the principles of military drill running through it would contribute more physical, intellectual, and moral benefit than any other system.

Dr. J. G. BLAKE, of the Boston School Board. — It is hardly necessary to defend military drill before an audience composed in part of the parents of pupils in our boys' high schools. I do not think that its most ardent advocates will claim that it is a perfect system of physical training; but there are many good points in its favor, and I am glad to add my testimony to that of General Moore.

The points which I should like to make in its behalf are, first its freedom from accident or injury to the boys. During a service of fourteen years on the High School Committee, and as chairman for several years, no report of injury to any pupils from participation in the drill has been brought to my notice. When we remember that in the Boston High and Latin Schools alone about twelve hundred boys take part in the drill, this exemption becomes remarkable. The same could not be said of the most carefully supervised gymnasium. Second, the boys enjoy it, and it is a rare occurrence to have an application for release from the drill. Of course, if any pupil is thought to be physically unfitted, he is not allowed to take part; and no pupil under thirteen years of age is allowed to drill unless by special request of his parents.

Third, it is a good mental and moral discipline—the boy learns to obey, and that is the first step towards learning to command. There is very little danger of the average American schoolboy being overtrained in this particular. Fourth, it helps to form character; all the associations of the soldier's life are such as we should like our boys to remember,—patriotism, chivalry, love and defence of country and home. Fifth, it is a powerful aid in maintaining a high order of discipline in the schools, and an incentive to study, as the offices are the rewards of good conduct and scholarship.

And lastly, with the present limited means at our command for a more perfect gymnasium course, we can do more in the time allotted to the drill—two hours a week—than by any other method which has yet been discussed—for the same number of boys.



The following committee on Physical Training was then announced by Dr. Harris in accordance with the resolution offered by Mr. Huling :—

Edwin P. Seaver, Superintendent of Schools, Boston.
 J. W. Dickinson, Secretary Board of Education, Boston.
 Edward M. Hartwell, M.D., Baltimore, Md.
 D. A. Sargent, M.D., Harvard College, Cambridge.
 Miss Amy Morris Homans, Boston.
 Ray Greene Huling, New Bedford.
 James A. Page, Boston.
 C. G. Meleney, Superintendent of Schools, Somerville.
 Prof. Lucile E. Hill, Wellesley College.
 Prof. J. B. Powell, Washington, D.C.
 Mrs. Louisa P. Hopkins, Boston.

Dr. Emerson was asked to speak for five minutes, in reply to the question asked by Dr. Sargent in the morning.

Dr. EMERSON. — Dr. Sargent thought that in the interest of education he would like to have me state in what books the ideas that I presented this morning could be found. He did not say this as doubting what had been said, as he told me personally. It was not a challenge. It was simply asking me to put you on the line of hunting up these things for yourselves. I will say that, in the form that I put them together, I do not know of any book where you will find them. But you can find the foundation in Carpenter's Physiology, and also in Flint's, and in several others that it is not necessary to mention. I only gave you the facts that could be found in books; the placing them was my own as was the logic growing out of them.

Dr. SARGENT. — I do not care at this late hour to reply in full to Dr. Emerson's paper. I asked him to state in what anatomies and physiologies the principles he advocated could be found, because as I understood him I could not help thinking that some of his statements were misleading.

Years ago I gave up making positive assertions in regard to the body. I felt that I could not tell a man that he was not symmetrically or harmoniously developed, for I did not know.

A great many other things occurred in connection with my early practice that made me feel that I was working in the dark, for I could find no data to guide me.

After comparing my experiences with a number of others who were interested in the study and search for truth, for principles, we agreed upon a uniform system of measurements, as the first step towards obtaining data that would be a guide to ourselves as well as to others.

We are now engaged in the great work of making physical measurements of individuals throughout this country and different parts of the world, for I have returns from countries as remote from us as Australia and New Zealand.

I have just been informed that the international committee of the Young Men's Christian Association have adopted the general principles of this system of measurements, and will carry the uniform plan into all of their gymnasiums.

Soon we may hope to have sufficient data to enable us to lay out the best system of physical training for all classes. Now we have not the light, we have not the facts.

I have occupied considerable of your time to-day in dealing with principles, because I do not think this is the place to discuss methods. It is the broad general principles upon which the subject is founded, upon which physical education must rest as a basis, that we want to understand. Anatomy and physiology furnish us the foundations. These subjects are the same throughout the civilized world. What we want to do is to find out what the laws of physiology are, and apply them to our systems of exercise. That is what they are doing at the great Central Institute at Stockholm; that is what some of us are doing here. At our training school in Cambridge we do not talk of methods or systems, but of principles.

Many teachers go into schools where they have no apparatus to work with. But after seeing the pupils they know what they want to do, and avail themselves of any agency at hand, as books, chairs, desks, etc., to accomplish the desired result. Any teacher who is tied to a system, or to the apparatus of an expensive gymnasium, is incapacitated for labor in this field; though these valuable adjuncts, like books and chemical and philosophical apparatus, furnish the best facilities for accomplishing the object in view.

If the question were asked, whether the methods current at

the Hemenway Gymnasium could be applied to the public schools, I should say certainly they can, though they are not at present adapted to such uses, as no demand until recently has been felt from this direction.

I realized sometime ago that the best way to get at the public schools was through the colleges and universities. There is no reason why the same principles could not be applied to the children of the public schools as well as to those in the secondary schools.

Many things have been said during this convention that will furnish food for thought and themes for discussion. But I think we have no right to consider this gathering a school. It is not for me therefore to answer such questions as were asked by Professor Curry, as to what develops this joint or that muscle. These are questions which a convention of gymnastic teachers might properly discuss. What we want to get at are the broad underlying principles that furnish the physical basis of education, that can be applied to the building of the intellectual faculties, because that must ever be the chief end and aim of the school teacher.

NILS POSSE. — I thoroughly agree with the last speaker, that the matter of method is of but little consequence comparatively. It is the instruction given to the teacher which is the essential part to be looked after. What we do in Sweden in the way of instructing a teacher to teach gymnastics is not to say, You shall teach the Swedish system. We are too broad for that. We instruct him in the theory of gymnastics, and teach him how to use all the material at hand, so that really we teach an eclectic system.

Perhaps you may think the Swedish system contains nothing but "light calisthenics"; if so, you are mistaken. It is true the Swedish method begins with very simple exercises; because a person's abilities are very small when he commences, no matter how old he is. He has to start where the child begins, not only in mental matters, but in physical as well. So also here. As his ability grows, so also the exercises change, and the exercises that previously were easy and gentle gradually become stronger. We do not in our schools "keep children

eight or ten years between the desks working at the same thing." We have progression. We try to give them as much variety as possible with such limited means as desks and chairs. But every high-grade school has its own complete gymnasium, where we take the scholars for about half an hour a day. We have three hundred (more or less) in one group, and they work with *apparatus*.

The instruction given to the teacher enables him to use for apparatus such simple things as desks and chairs. It was stated here that these exercises could not be done in the school-room. I venture to say that they can be done, and are done every day in Boston schools, between desks and chairs, and that they have been used there from day to day for nearly a year. Those who doubt can go and see for themselves.

It was also stated that the Swedes and other Europeans have come over here for information, because they found that their methods were "insufficient." Do Americans go abroad to study because their country is inferior? No; they go because they wish to become broadened. So do we. Our system is very good because it is eclectic; and we are perfectly satisfied with its efficiency. The theory of gymnastics recognizes no system; for if gymnastics are founded on the theories that should be fundamental for all gymnastics, they will all be alike, or almost alike; they will be *gymnastics*, and need no distinguishing prefix. Why, then, do we come here? Why do we go and look into other systems? Because we wish to increase our material, and to become as broad as possible. We do not say that we wish to have the Swedish system in Sweden because it is Swedish. We take the best, no matter whose it is, just as the French gentleman has said, "if your neighbor has something you want, go and take it," provided he is willing to give it.

Dr. HARTWELL. — I am very glad to re-echo almost all of what Mr. Posse has said in regard to the Swedish system. It is a *system* because it proceeds from principles carefully thought out, by means and measures carefully selected, and its parts are joined together for definite purposes, with the idea of accomplishing certain definite results at each stage of the teaching. And I agree with him entirely that the Swedish is based

upon physiological principles; but unfortunately there are national prejudices which come in here and there and prevent the partisans of one system from properly appreciating other systems at their full value. For instance, I found in St. Petersburg a class preparing to become teachers of gymnastics, trained according to what was termed the Russian-American system, its originator having been greatly impressed by the late Dio Lewis's books, — whose contents are largely, as I have said, adaptations from the German system of gymnastics. Nowadays Germans and German institutions are not popular in Russia.

It is not calling a thing by a name that makes it a system, and that is the point I wish to urge in regard to the so-called American system. There is none. There are various attempts to systematize gymnastics in various parts of the country, under different people, with different and limited experiences. They join various exercises together, and tag them *a, b, c—x, y, z*, and claim that the result is a system. It reminds me of the classification of Ohio colleges and universities, made by some observant person once. He said when there were something like forty such institutions, that those that had a building of three stories were called universities, while those that had buildings of only two stories were called colleges. By the time we get a three or four story experience, and when we have had that for twenty, thirty, or forty years, we can begin to talk about an American system. The fact is, these Swedish and German systems shade into each other, having much in common. Here is one of the last books in Swedish on this subject of gymnastics, one of a series, edited by Captain Victor Balck, of the Central Institute of Stockholm, the best institution in the world of its kind. I believe that the teachers from the Central Institute are the best in the world of their kind, because they are more thoroughly taught, and for a longer time than any body of teachers that I know of. In this book you will find certain German exercises recommended. When the two systems are compared, it will be seen that certain exercises are left out of one that are used in the other. There was, at one time, an attempt made by a Prussian army officer named Rothstein, to establish the Swedish system in full force in Prussia, in opposition to the

then partly developed system, which, being based on the ideas of Jahn, was very popular. The result has been rather curious. Rothstein banished certain pieces of Jahn's apparatus, such as parallel bars, horizontal bars, etc., from the Central Gymnastic Institute in Berlin, of which he was director. This led to a tremendous turmoil. After some years of discussion a medical commission was formed, in whose deliberations such men as Virchow, Langenbeck, Du Bois Reymond, took part, to consider this question. The result was that the banished apparatus was reinstated, the decision of the commission being that "the bar exercises might be improved, from a medical point of view, but should not be suppressed."

On the other hand, it is worthy of notice, that in Norway the use of both Swedish and German methods is common in the gymnastic clubs. In the German army certain pieces of apparatus constantly used are of Swedish origin, and they are used according to the methods originally introduced by Rothstein in the forties. Our American system, as it is called, resembles the corner of a crazy quilt, as compared with the design of a Turkish rug, when compared with the Swedish and German. The question with us should be, How shall we get the best elements for a system that shall fit our case? My reply is, by carefully studying both systems. It is largely a question of taste and convenience which you introduce. Do not be in a hurry to introduce either. We Americans have started off in what may be called a bumptious manner, in this as in other lines. But that need not prevent us from the saving grace of being able to learn from the example and experience of others. We are learning all the time, and we are very willing to learn. We have at least established a *department* of athletics, if not a system. We have an inherited taste for out-of-door games that is not going to be squelched. We have Dr. Sargent's system of supervision and guidance, on the one hand, and such work as Dr. Wey is doing, on the other hand,—building up by physical training the most poorly organized and criminal defectives, to show that we are capable of originating new methods. From the experience of the Elmira Reformatory we have gained more proof of the capabilities of this work than from the work yet done in any

college. It shows that the effect of physical training, even when that training is not of the most elaborate nature, is improved brain power.

I have been asked if I have ever heard of devolution. Devolution is implied by evolution. One has but to understand, to know that the latest acquired of our movements, which are the most unstable and the most difficult of muscular movements, are those which give way the first under the onset of disease. The nerve centres which represent them are usually the first to be attacked.

In paralysis, control over the lips and tongue is sooner lost than that over the muscles of mastication or respiration. Perhaps no better or more striking example of devolution, proceeding from improper training and the disregard of the plain teachings of physiology, could be adduced than that whereby a minister becomes a sore throat.

On motion of Mr. Ray G. Huling, who also put the motion, the name of Dr. William T. Harris was made the second name on the Committee on Physical Training.

On motion of Mr. Huling it was voted that the committee should have power to fill vacancies made by resignation, and that sufficient time to prepare a full report should be allowed.

Luther Gulick, M.D., Director of the Physical Department of the Young Men's Christian Association, Springfield, Mass., offered the following resolution:—

Resolved, That the most cordial thanks of this Conference be extended to Mrs. Hemenway and to Miss Homans for the generosity and large-mindedness that led them to undertake and guide this Conference; and to express our conviction that not only the Boston public schools, but the whole cause of physical education in America, has received a great impetus from this meeting, which is the result of their labors.

The motion was seconded by Dr. Winfield S. Hall of Haverford College, and was passed unanimously.

The Conference adjourned.

NAMES OF WRITERS AND SPEAKERS.

Anderson, W. G., M.D., 54.

Blake, J. G., M.D., 125.

Chadwick, H. L., 59.

Channing, Walter, M.D., 77.

de Coubertin, M. Pierre, 112.

Curry, S. S., 115.

Dunton, Larkin, 33.

Eberhard, Carl, 22.

Emerson, C. W., M.D., 87, 126.

Enebuske, Claes J., 35.

Gröner, Emil, 34.

Gulick, Luther, M.D., 132.

Hall, Alice T., M.D., 59.

Hall, Winfield S., 132.

Harris, W. T., LL.D., 1, 28.

Hartwell, E. M., M.D., 5, 29, 33, 61, 129.

Hill, Lucile Eaton, 79.

Hitchcock, Edward, M.D., 32, 56, 57.
Huling, Ray Greene, 81, 96, 98, 132.

Ingraham, L. V., M.D., 82.

Ladd, Carolyn C., M.D., 80.

Meath, Earl of, 51.

Metzner, H., 23.

Moore, Hobart, 121.

Posse, Nils, M.G., 42, 128.

Putnam, Helen, M.D., 60.

Reynolds, John P., M.D., 33.

Sargent, D. A., M.D., 62, 95, 126.

Seaver, E. P., 28, 32, 33, 96.

Tousley, Ruth C., 80.

Walker, Francis A., 85.

Wey, Hamilton D., M.D., 99.

Whittier, F. N., M.D., 83.

